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THE VALUE OF HUMAN LIFE.

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Many attempts have been made to estimate the money value of human life, some of the most careful by members of this Association. The usual point of view is to consider that the money value of a life is represented by its value to its possessor, or to his family. Most hygienists count the money value of life in terms of earning power or wages. To the individual and his family his earnings are indeed the most urgent economic factor of life and it is natural that this viewpoint should be first in the minds of most of us. Though it does not take into consideration the very great economic importance of the non-wage-earning work of wives and other housekeepers, an estimate of wages lost by sickness and death does serve to illustrate the enormous dimensions and importance of the problems which the hygienists have to solve.

According to this view the capital value of a human life varies according to age, depending as it does on the two factors of earning capacity and expectancy of life. How much does a person earn and how long will he live? The answers to these questions will enable us to state how much he is worth. Years ago, Farr, in England, estimated that the new born babe of an agricultural laborer was worth $25 and figured out an increasing value up to middle life, after which the figures slowly declined. Fisher, assuming $700 as the average annual earnings of all workers in the United States, though he asserts, and probably correctly, that $1,000 is nearer the true figure, calculates that the value of a wage earner varies from $90 at birth to a maximem of $4,100 at 30 years, sinking again to $2,900 at 50. He further estimates, by using the census figures for age distribution, that the average economic value of the inhabitants of the United States is $2,900.

We are not, however, obliged to rely on *estimates* of earning power. Price has made a careful study of the earnings, and consequent loss to themselves by disability, of a large number of workers in Maryland, who were afflicted with tuberculosis. He found that the minimum, actual and potential loss, was nearly $3,000 and that maximum loss was $36,000 in the case of a woman 36 years old receiving a salary of $1,200.

Leighton has by another method figured the monetary value of life at different ages. His estimate is made by averaging the damages awarded by the courts for loss of life. His figures are for children under 5 years $1,500, a maximum for adults between 25 and 30 of $7,500, and a minimum of $1,000 at 70 years.

What a man earns indeed represents his money value to himself or to his family but according to some it is not a proper measure of his value to the community. According to Hoffman the economic gain to society is rather the value of the product over and above wages and the other costs of production. This Hoffman attempts to estimate from the census figures. He says: "It is probably safe to assume that the net gain to society is at least equivalent to about $300 per annum in the case of male wage-earners employed in American manufacturing and mechanical industries. Of course, the gain is less at the younger ages and probably remains fairly the same or level during the ages of 30 to 50, when the normal physical strength is enhanced by practical trade education and experience. The degree of variation in value may be placed between the minimum of $75 at the age of 15 and a maximum of $400 at the age of 32. If, upon a basis of average net gain to society of $300 per annum, the fifty active years of a workingman's life represents a total of $15,000, then if death should occur at the age of 25, the economic loss to society would be in round numbers $13,000; if at the age of 35 it would be $10,000; if at the age of 50, $4,400; and, finally, at the age of 60, the loss would still be $1,000." Nicholson apparently takes the same view and he estimates that the money value to the nation of a human life in England is towards $5,000.

If these estimates of the money value of a human being to his family or to society, be applied to the population of a country such as the United States, the figures reach enormous proportions and if we estimate the money loss which results from permature death, or disability from disease, or accident, the amounts are among the hundreds of millions or even billions. The public is told that a large amount of the disease causing these losses is preventable and that the money needed for prevention is only a tithe of the amount now lost. Increased appropriations for public health work are called for and it is usual to compare the small appropriations for the saving of human life with the large appropriations for the saving of hog life and to call attention to the fact that our cities commonly spend many times more on the fire department to protect property, than they do on the health

department to protect health. In view of the tremendous money losses which it is alleged the community suffers, it is urged that this is a gross economic blunder. We are again and again told of the folly of refusing to spend the millions needed to prevent disease when this expenditure would yield a money return of hundreds of millions. Nevertheless our councils and our legislatures refuse to be greatly moved by these appeals and appropriations have generally shown no sharp advance. Why is it that this bargain is passed by?

Granting the estimates of our economists, and they are quite likely approximately correct, and granting that the health measures proposed will be effective, which is by no means certain, we may ask how does this viewpoint of the legislator and the taxpayer differ from our own, or what flaws are there in the business proposition which is being so zealously promoted.

As the extent and manner in which the burden of a tax is assessed and distributed determines in a large degree the attitude of the public towards that tax, so the distribution among the people of such losses as we are considering affects the attitude of the people towards measures intended for their prevention.

As regards the loss to the family from the cessation of the earnings of the sick or dead bread winner, if the family is thus compelled to receive public assistance *this* portion of the loss is distributed upon the whole community but the amount of such assistance is usually small as compared with the total loss of earnings concerning which so much is said. The greater part of the loss is not distributed and is not felt by the rest of the community, but is a burden upon the family alone, being met by economies and increased labor by other members of the family. Most legislators and taxpayers have seen concrete instances of the economic loss to the family from the death of the wage earner and the sorrow and suffering which it entails. It is by no means difficult to enlist their sympathies and to stir them to action by showing how such sorrow and suffering may be prevented. But it is a very different and much more difficult task to make the taxpayer believe that the losses of the bereaved family will fall on him, or that new wealth will flow to him by preventing the death of other wage earners. If his city is to spend money for sanitary improvements he knows that he will have to pay the tax. It is difficult to persuade him that even though a hundred lives are thereby saved each year, he will be one whit the richer. Is it not as easy to persuade a city council to spend a half a million for a filter, for the simple reason that it will prevent a hundred deaths a year, as it is to persuade them that this half million investment will yield $300,000 annually, of which tidy income each man will have his share. Most intelligent people suspect all schemes promising such excessive profits. Can we take the time to convince them of the genuineness of ours?

Let us turn now to the other view of the value to the community of the life of the worker as measured by the value of the product. Does not the wage earner believe that this value first appears as profits going to the employer of labor. No matter how generally this value may ultimately be distributed among the population, does not the wage earner feel that while that is no question about his paying his share of the tax imposed by sanitation, there is a good deal of doubt about his receiving any share in the profits? If he helps to save the lives of fellow-workers he may indeed see that more work will be done and more product result, but will he not feel that the product will go directly to the employer and not come to him? This brings us to another danger, which is likely to develop, if we insist too strenuously upon the cold-blooded method of calculating the value of life and health in terms of dollars and cents. The average wage earner, whether laborer or mechanic, believes in the law of supply and demand as affecting his wages. He sees that there is at most times and in most places, no marked dearth of labor. To most people it seems that there are more workers than jobs. It is easier to hire a man than it is to get a position. What will it avail our wage earners to increase their numbers by sanitation? It will take their money in taxes but how will they receive a return? Will not the increase in workers merely result in a decrease in wages, they may ask?

Now let us turn to the employers of labor, the class to which most of the large taxpayers belong. Do not they perhaps already hold to too great an extent the merely money view of the value of a human life. Are they not too prone to consider their employees as machines which yield them a profit and from which they strive to get the greatest possible product? In a very practical sense the value of a machine is measured by what it costs to replace it, not by the value of its products. It costs money to replace the machine of steel, but under present conditions it costs nothing, either to the employer or the community, to replace the machines of flesh and blood. New ones come to us from the ends of the earth and there is no interruption of the product. The employer usually finds no scarcity of labor. He is indeed rarely compelled to pay a bonus to procure employees. If there is need, in a short time help will come from Italy, from Syria, from Russia, and without cost to him or to the community in which he lives. The employer well knows that he must pay his share of the cost of better sanitation, and if he asks how and where he will receive into his pocket the pecuniary value of the lives to be saved, will we not have difficulty in instilling in him a living faith that his sanitary tax is a paying investment?

Under some circumstances the death of a human worker does mean a great and real financial loss. The experience of railroad and canal builders at Panama before the advent of Colonel Gorgas showed this. It was so evident that the federal government was willing to spend annually on a

population of about 60,000 a sum approaching $2,000,000.* The canal will cost perhaps $300,000,000. If it had not been for Colonel Gorgas' work it would doubtless cost double that amount, if it could be built at all. This was certainly a good financial investment. It was so because without it labor on the Isthmus would have cost double or treble what it does. Who believes that if Brockton, Erie, Fort Wayne, Jacksonville, Harrisburg and Pawtucket, with about the population of the Canal Zone, should spend $2,000,000 annually on sanitation the benefits could be figured out in dollars and cents, and the taxpayers be made to feel that they individually would receive a money return for the expenditure.

Is it not probably true that one of the reasons why the community fails to be impressed by the startling financial loss attributed to the ravages of disease is that there is an instinctive feeling that from a money standpoint a human being is not a very valuable machine and that the replacement of one of these machines by another is not, under American conditions, a very serious drain on the community?

It is doubtless well that these estimates of the money value of life have been made. The message from the economists that the cost of prevention will be more than repaid is gladly heard by all broad-minded persons. Great numbers of people, however, look at these matters from a more personal standpoint. I would not defend these narrower viewpoints, some of which I have suggested in illustration, though they may not be wholly wrong, but I do believe that the broad statements as to losses by disease and gain through sanitation produce little impression on large numbers of persons. Let us not deal too long in glittering generalities. It is our duty as hygienists and health officers to be specific. We must measure more accurately the causes of disease; we must show more clearly the modes of prevention; we must demonstrate beyond question the efficiency of our methods; we must figure more carefully their cost and we must plan our expenditures so as to get the greatest possible results.

It is my belief that it is unwise to emphasize the financial side of the public health question in quite the way, or quite so much, as has been done of late. Life and health are cherished by all. It needs no argument to prove that it is good to be well and that it is wise to spend money for health. It is proper to consider cost in relation to results and financial savings, when such can be figured with accuracy, but there is much in the world which cannot be measured in terms of money, though to so measure it is doubtless the tendency of the age. Should we not place our profession on a higher level by resisting this tendency instead of yielding to it? Is it not dangerous to rely upon a balance sheet of life and death when there are so many chances of error in our calculations? Is it not enough to urge expenditures for the preservation of health because the happiness of mankind will be promoted thereby?

*The whole of this amount ought not properly to be charged to sanitation, but, as they stand, the official figures show an enormous profit from the sanitary work.

MOSQUITO CATCHING IN DWELLINGS IN THE PROPHYLAXIS OF MALARIA.

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The purpose of this paper is to present for the consideration of sanitarians an anti-malaria measure extensively employed in the Panama Canal Zone, and one on which we have learned to place considerable reliance. This measure, in so far as I have been able to learn, is not applied to any extent elsewhere. I refer to catching Anophelines by hand within dwellings and in traps especially designed for this purpose. The only mention of this prophylactic measure that I have been able to find in literature, is that by Sir Ronald Ross, who, in his book "The Prevention of Malaria" states in Section 35, that Sir William MacGregor employed a boy to kill mosquitoes in his house in Lagos, in 1901.

The first systematic application of mosquito catching within habitations as a prophylactic measure against malaria, in so far as I have been able to learn, was made in the Canal Zone, in April, 1908, at a camp near Cocoli. The camp, composed of unscreened tents, was to be maintained only about five months, and it was not thought practicable to incur the great expenditure involved in a thorough anti-malaria campaign. When the camp was first established, as many as thirty Anophelines could be seen in a tent in the daytime, and many more after dark. One man was employed to kill the mosquitoes in these tents, He worked from 6.00 to 11.00 a. m., and from 1.00 to 5.00 p. m., daily. In the four and a half months of this camp's existence, the malaria incidence was a little over 1 per cent. per week. (LePrince in Ross' "The Prevention of Malaria.") This, despite the fact that the camp was surrounded by Anopheline breeding areas, where larvæ were abundant.

Another remarkable instance is described by LePrince in Ross' book cited above. In June, 1908, several hundred United States marines were quartered for about eight weeks on a hill near Panama known as Diablo Hill. During this period the malaria incidence among the marines was 14 per cent. a week. In May, 1909, some living cars were located on the same hill. The Anopheline breeding was just as it had been at the time the marines camped there. From the first week in May to the end of November in the rainy season, when malaria incidence is high in Panama, only four cases of malaria occurred among the forty laborers occupying these cars,

a weekly incidence of about .3 per cent. The difference was due to having a man devote half an hour a day to the destruction of the Anophelines found in these cars, at a cost of five cents a day for the labor.

The most remarkable instance of the efficacy of Anopheles catching in the prophylaxis of malaria, is the case of the Monte Lirio Camps in the Canal Zone. During 1909, in the course of the construction of the new Panama Railroad, a number of construction camps were located in the jungle along the line of construction. Four of the largest of these camps, with an aggregate population of about 1200, were located along twelve miles of the railroad, at intervals of about three miles.

An anti-Anopheline campaign based on the installation of drainage, oiling, etc., that is to say, on measures directed against the propagation of Anophelines, would have been prohibitive in cost. It was therefore decided to house the employees in screened cars and to inaugurate systematic daily catching of mosquitoes within these cars. Very little was done in the way of attacking the breeding places of Anophelines with which the camps were surrounded. Anophelines were very abundant in these camps, the daily catch in the cars reaching several hundred. The malaria incidence in these camps, however, was practically the same as the average incidence for the Canal Zone, as is shown in the table on page 110; showing by months the malaria incidence for these camps and for the whole Canal Zone. In this connection it must be noted that the incidence for the camps is calculated on the basis of the provisional diagnosis made on admission to the hospitals, while the incidence for the whole Canal Zone is calculated on the diagnoses made on discharge. The provisional diagnoses show a somewhat larger number of cases of malaria than the final diagnoses;—the tendency in the Canal Zone is to err on the side of malaria in making a provisional diagnosis.

The technique employed in catching mosquitoes is as follows: A cylindrical glass vial about 4 1-2 inches long and 1 inch in diameter, such as is commonly employed by entomologists for collecting insects and which is obtainable at any druggist's supply house, is used.

Into the bottom of the vial are placed some ordinary rubber bands cut into short lengths and packed into a layer about an inch thick. On top of this is placed a small plug of cotton to keep the rubber in place. A few c.c. of chloroform is now poured into the vial and a strip of paper loosely packed on top of the cotton in such a manner as to retain in the vial the killed mosquitoes without allowing then to become entangled in the cotton. The vial is corked with an ordinary cork.

Of course, it would be possible to charge this vial with potassium cyanide imbedded in plaster-of-paris, but with the low grade of labor we are compelled to employ, we prefer not to use cyanide.

In addition to the chloroform vial, the mosquito catchers are also equipped

with an ordinary "slapper" made of a six-inch square wire gauze attached to a two-foot stick.

Equipped with a "slapper" and chloroform tube, the mosquito catcher enters various dwellings and searches for mosquitoes. A few days of instruction suffice to teach even the decidedly stupid West Indian negro laborer how to find and destroy mosquitoes. The mosquito catchers are instructed to kill all mosquitoes they see, so that in addition to Anophelines other species are also destroyed. With a little experience, it is comparatively easy to catch with a chloroform tube mosquitoes resting on solid objects, especially is this true of the Anophelines, which are not very easily frightened away. During the day the Anophelines seek dark places, such as the corners of rooms, recesses behind pictures, clothing, etc. They also apparently prefer to rest at a height not exceeding six feet from the floor. Early in the morning and in the dusk of the evening, however, Anophelines are quite commonly seen on the inside and outside of the screening on windows, doors and verandas. It is on the Anophelines resting on screening that the slapper is used, since the chloroform bottle is not very effective in these situations.

The method of using the chloroform vial is of course very simple. The collector having spied an Anopheline uncorks his vial and gently but rapidly places it over the insect. In a moment the chloroform fumes overcome the insect and it drops into the tube.

In the search for Anophelines an electric torch, or an incandescent lamp attached to a long cord, or a lantern—although the latter is not desirable because of the danger of fire—is of great assistance, as it is somewhat difficult to see a mosquito resting on an object which may be very near its own color. Where it is contemplated to carry out systematic Anopheline destruction in habitations, the interiors should be painted a very light color, so as to facilitate the work of the mosquito catcher. This is very important. In two camps on the Canal Zone slate colored interiors have so hampered the work of the mosquito catchers that practically no mosquitoes were destroyed. Repainting the interiors a light green immediately resulted in greater number of Anophelines caught.

The early morning and evening hours are the most favorable for hunting Anophelines in houses, and, in so far as possible, dwellings should be visited by the mosquito catchers before sweeping, etc., has been commenced, this process tending to disturb the Anophelines and drive them into recesses where they cannot be seen nor reached.

In addition to catching mosquitoes by hand, a trap designed by one of the sanitary inspectors on the Canal Zone, Mr. C. H. Bath, has been employed to a considerable extent, and has proven quite efficacious. The trap is constructed on the principle of the ordinary funnel fly trap, extending into the form of a semi-cylinder, with two ridges inside of it, the apeces of

which are perforated by longitudinal slits about ¼ inch wide and 3 inches long. Through the slits in these ridges the mosquitoes enter the chamber of the trap and cannot, for some reason, find their way out again.

The traps may be installed to catch mosquitoes as they endeavor to gain admittance into the building, or when they endeavor to leave. In the first case, the opening of the trap is turned outward, and in the second, inward. The place in which the trap is fastened is of considerable importance and should be determined by experiments in each locality, as there seems to be considerable difference in the flight habits of the various genera of mosquitoes. In the Canal Zone more Anophelines are caught in a trap installed on the lee of buildings, and more Culicines in traps installed on the windward side of buildings. The traps should be installed in such a manner that their daily detaching for the purpose of subjecting the insects within the traps to the action of some insecticide, such as the fumes of sulphur or pyrethrum, may be easily accomplished. After the insects have been killed, the trap is opened and the contents removed.

In addition to catching mosquitoes, and thus reducing the chances of attack upon the inmates of the dwelling, as well as catching mosquitoes that have bitten an infected person before the plasmodia of malaria has had a chance to mature within the mosquito, the trap may be made to serve other purposes; it may be used, for instance, to establish an Anopheline index for a given locality.

The mosquito trap may also be employed in insect work in other fields which are, however, foreign to the purpose of this paper.

When it is remembered that in malaria a period of at least one week must elapse before the mosquito which has fed on an infected person can transmit the infection to another person, and when it is recalled that an Anopheline filled with blood becomes sluggish and does not fly very far for some time, the efficacy of killing mosquitoes within habitations becomes self-evident.

When the work was first undertaken in the Canal Zone, it was not believed that it could be successfully carried out, because it was thought improbable that any but highly trained men could find and kill Anophelines in sufficient numbers to accomplish any good. Experience, however, has proven otherwise. Unlettered West Indian negro laborers at a compensation of ten cents an hour, the lowest wage paid in the Canal Zone, are employed in this work, and, with very little training, do it in an entirely satisfactory manner.

Summary.

Catching mosquitoes by hand within dwellings is a measure of great value in the prophylaxis of malaria. It is especially applicable to temporary camps.

If the dwellings are screened the catching should be done early in the

morning and in the evening. If the dwellings are not screened and the Anophelines are abundant, a search for Anophelines should be made four or five times a day.

In order that the catching may be efficiently done, it is necessary to have the dwelling well lighted and the walls painted a light color or whitewashed. In dark dwellings some form of portable illumination should be used.

In screened buildings hand catching may be supplemented by properly designed and installed mosquito traps.

TABLE OF MALARIA INCIDENCE.

Months.	1909.		1910.		1911.		Remarks.
	Construction Camps.	Entire Zone.	Construction Camps.	Entire Zone.	Construction Camps.	Entire Zone.	
January	.....	.....	1.55%	.96%	.67%	.72%	Dry Season.
February	.....	.....	.67%	.71%	.42%	.77%	Dry Season.
March	.....	.....	1.44%	1.04%	.28%	.85%	Dry Season.
April	.....	.....	2.50%	.81%	.56%	.68%	Dry Season.
May	.....	.....	2.30%	1.16%	1.94%	1.91%	Rainy Season.
June	.....	.....	2.41%	2.42%	5.06%	3.59%	Rainy Season.
July	.....	.....	3.29%	3.39%	2.84%	4.14%	Rainy Season.
August	.....	.....	1.34%	2.81%	1.36%	1.82%	Rainy Season.
September	.....	.....	.96%	1.76%	2.64%	1.40%	Rainy Season.
October	.....	.....	2.59%	1.25%	2.58%	1.00%	Rainy Season.
November	.....	.....	.50%	1.16%	2.58%	.82%	Rainy Season.
December	.94%	1.50%	.77%	1.16%	1.21%	.76%	Rainy Season.
Average per month	.94%	1.50%	1.53%	1.55%	1.84%	1.54%	

I am indebted to Col. W. C. Gorgas, Chief Sanitary Officer, Isthmian Canal Commission, for permission to contribute this paper.

PUBLIC HEALTH SERVICE NOT A MEDICAL MONOPOLY.

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Read before the Sanitary Engineering Section, American Public Health Association, Washington, D. C. September, 1912.

The formation of a Sanitary Engineering Section in the American Public Health Association is an important and progressive step from many points of view. Not the least of these is the official recognition thereby given of the interest and value in public health work of professional men other than physicians. This paper is presented with a view to emphasizing this feature, and affording opportunity for a discussion of whether such recognition ought not be extended to the abolition of the apparent monopoly of public health service still legislatively maintained for medical men in most of the states. In such a paper it would be impossible to avoid references to specific examples in certain states. It should be borne in mind, however, that where this is done, it is solely for the value of the example as illustrative of the subject under discussion, and not with any desire to criticise any person or locality.

The present situation is but a natural outgrowth of sanitary history; for, in the beginning, it was medical men only who understood anything of the nature, cause, course and character of disease. Moreover, early sanitary work was confined largely to isolation, treatment, disinfection and fumigation at the focus of infection. It was but natural, therefore, that early public health laws should have required that the services of physicians be secured for administering the measures necessary to safeguard the health of the people. It is a superb example of the altruism of the medical profession that, in public service, private practice and scientific research, it has met these demands with such a fine spirit, and so successfully, that to it, to a great extent, is due the noble structure of modern sanitary science, as it exists today. Tribute should unstintedly be given to such professional self-sacrifice, in decreasing the ravages of these ills, the attendance upon which constitutes the chief source of income. It must not be forgotten, however, that the greatest contribution of all, the foundation upon which modern sanitary science is built, was made by Pasteur, a chemist and mineralogist, who had no medical training.

The development of sanitary science by medical men and their fellow-workers has given the world a new conception of disease and its prevention. It has been shown that infection really does mean "a making into from with-

out," and the environmental nature of the cause of many of the diseases has become firmly established.

As a result, medical service, st ictly speaking, has become a relatively lessened portion of the modern health organization's activity. The control of the environment has become of even greater importance, as a sanitary measure, than personal precautions at the bedside; for, with the growth of city life, the former may directly affect thousands or even millions, while the latter offer direct protection but to a few individuals. The value of medical men in public health work has remained and has even increased with the development of sanitary science and the growth of specialization; but alongside of him important places have been made for the engineer, the chemist, the bacteriologist, the demographer and the sociologist.

Educational institutions, responsive to new standards and new public needs, are now training men especially for every branch of this new public health service. Courses in Sanitary Engineering, like that of the Massachusetts Institute of Technology, the Harvard Graduate School of Applied Science, the Universities of Illinois, California and Pittsburgh, and many other universities of this and foreign countries; courses in Sanitary Chemistry, Bacteriology, Sanitary and Vital Statistics, Economics and Sociology: all these are constantly training men for the various technical services of public health work in a manner that is unquestionably superior to the training offered by any medical course. For the broader service required of health officers and for the administration of public health work the courses in public health, leading to such degrees as Doctor of Public Health, and the diploma in public health, at Harvard Medical School, University of Pennsylvania, Universities of Manchester, Liverpool and Edinburgh, and other institutions, are in a like manner superior to the medical training. It must be generally agreed, therefore, that there is no longer a scientific basis for continued legislative restriction of the public health service to any one profession.

If this is true of the technical services of public health work and for the administration of local public health measures, its truth is all the more apparent in such an organization as a State Board of Health, where, in addition to the control and supervision of all these technical services, the members are charged with the administration of an important portion of the police power of the sovereign state, and are thrown in contact by their actions with constitutional rights of individuals and communities. It is all important that the administrators of the State Board of Health work shall be broad gauge publicists, humanists, men of wisdom, deliberation, judgment, and administrative ability. Detail technical work may be left to trained assistants; and this is admirably provided for in many states by authorizing the appointment, at attractive recompense and with large

responsibilities, of engineers, chemists, bacteriologists, doctors, statisticians and others.

Some of these principles were recognized so clearly by the wise, far-sighted Sanitary Commission of Massachusetts, over sixty years ago, that they cannot be better expressed today than in the words of some portions of its report. In speaking of the constitution of the State Board of Health, which was proposed, it says:—

> We recommend that the Board, as far as practicable, be composed of two physicians, one counsellor at law, one chemist, one natural philosopher, one civil engineer, and two persons of other profession or occupation; all properly qualified for the office by their talent, their education, their experience and their wisdom. . . . The members should not be selected exclusively from one profession, for two reasons:—1. Numerous questions requiring a knowledge possessed by different professions will be presented for discussion and decision; and it is desirable that the Board should be able to bring competent knowledge to the investigation of every subject. 2. To show to all that the promotion of public health is a matter which does not belong exclusively to the medical profession, but concerns every profession and every person. The idea which too generally prevails, that everything relating to health belongs exclusively to one profession, operates against sanitary improvement. The services of medical men are indispensable; but the services of other professions, and of every person in their respective spheres, must be put in requisition, before reform can be complete. . . .
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> All should make themselves thorough masters of the objects of their appointment; have sagacity and foresight to perceive the bearing and effect of every measure proposed; be eminently practical men, wise in deliberation, and judicious in decision.

With similar breadth and wisdom the recommendation regarding the Executive Officer of the Board took the following form:—

> We recommend that the Board be authorized to appoint some suitable and competent person to be the Secretary of the Board, who should be required to devote his whole time and energies to the discharge of the duties of his office, and be paid a proper salary for his services. . . .
>
> He should be amply qualified, in all respects, for the office; know what to do, and how to do it, and what information to obtain, and how to obtain it. He should be thoroughly educated in the science of public health, and the causes and prevention of disease; and be capable of arranging, analyzing, abstracting, combining, and publishing the facts that may be collected, with proper deductions and conclusions from them, in such form as will be most useful to science, and contribute most to the improvement of practical life. To discharge the duties of such an office in such a manner as they might and ought to be discharged, would, in our judgment, be enough to satisfy the desires of any man who wished to be honored and useful.

This report is one of the most enlightening documents and shows a thorough vision of sanitary science as we understand it today, even before many of the truths now known were demonstrated; it should be in the hands of every student of public health questions. There are a number of other things of such interest and importance that I shall take the liberty of quoting from several passages somewhat at length. It is stated in the early part of the report, as follows:

We believe that conditions of perfect health, either public or personal, are seldom or never attainable; . . . and that measures for prevention will effect infinitely more than the remedies for disease.

Again, quoting from Hippocrates, "the Father of Medicine," to show that environment is a large factor in the spread of disease, as follows:

When asked, "Who is the physician that is an honor to his profession?" he replied, "He who has merited the esteem and confidence of the public, by profound knowledge, long experience, consummate integrity; who has been led through the whole circle of the sciences; who has a due regard to the seasons of the year, and the diseases which they are observed to produce,—to the states of the wind peculiar to each country, and the qualities of its waters; who marks carefully the localities of towns, and of the surrounding country, whether they are low or high, hot or cold, wet or dry, who, moreover, neglects not to mark the diet and regimen of the inhabitants, and, in a word, all the causes that may produce disorder in the animal economy."

The Commission also quotes from Doctor Duchatelet, an eminent member of the Council of Health at Paris, with regard to the qualifications of officers of public health, as follows:

It is generally thought in the world that the medical knowledge acquired in the schools is all that is necessary to become a useful member of the Council of Health. The greater part of medical men themselves share this opinion; and, on the strength of some precepts which they have collected from books on health and professions, they think themselves sufficiently instructed to decide on the instant the gravest questions, which can only be resolved by special studies. . . . To be really useful in the Council, it is necessary to have an extended knowledge of natural philosophy; to know with exactness the action which trades may have on the health of those who exercise them, and the much more important action of manufactories of every species on men congregated in towns, on animals, and on plants. . . . From what has been said, the necessity will be evident to introduce into the Council those physicians who have made health, and particularly the public Health, a special study; and to join with them chemists, and, above all, manufacturing chemists and other professions.

Again they quote from an article on the Board of Health of England, in the *Edinburgh Review*, for January, 1850, as follows:—

We believe that some not unnatural jealousy has been felt by the medical profession, as to the constitution of the Board; but we cannot regret the circumstance that its chief operative leader is not a physician. It is very necessary that such a department should have the best scientific counsel and assistance that the country can afford . . . but, on the other hand, it seems indispensable that an administrative body, coming in contact with constitutional rights and responsibilities, should have another kind of leadership. To balance the heroism and disinterestedness, for which we most willingly give them credit, the medical body have some defects, especially in their jealousies and prejudices. . . . Nor is it uninstructive to remember that, though they have liberally responded to it, the idea of sanitary reform, on the scale which we are now considering, did not *originate* within the medical profession. And, in truth, the constant direction of the faculties to the cure of actual disease, does not seem likely to leave much observation to devote to the study of its external causes.

Some other of the recommendations to show an appreciation of environmental causes are:—

We recommend that, in laying out new towns and villages, and in extending those already laid out, ample provision be made for a supply, in purity and abundance, of light, air, and water; for drainage and sewerage, for paving, and for cleanliness.

We recommend that local Boards of Health, and other persons interested, endeavor to ascertain, by exact observation, the effect of mill-ponds, and other collections or streams of water, and of their rise and fall, upon the health of the neighboring inhabitants.

We recommend that the local Boards of Health provide for periodical house-to-house visitation, for the prevention of epidemic diseases, and for other sanitary purposes.

Again, they quote from the weekly summary of the Public Health, issued by the Registrar General in the midst of the cholera epidemic of 1849, as follows:

No city, perhaps, ever possessed such an efficient body of medical men as are now practising in London. . . . Nearly all the sick have been seen by these practitioners, yet 14,500 persons have already died of cholera in London. How is this? The medical force will be found to have been employed at an immense disadvantage. It is called into action at the wrong end of the malady. Inquiries prove, that while medical advice is generally sought in the characteristic stage, it is seldom obtained in the premonitory stage, when the power of medicine is decisive; and to that earlier and still more important period preceding the premonitory stage, which is prevented as easily as cured, medical practice has had little or nothing to say. Cholera here, also, only shows in high relief what exists in ordinary circumstances. Medical men rarely if ever treat the beginnings of diseases, and are scarcely ever consulted professionally on the preservation of the health of cities or families. The art of preserving health is taught in no regular course of lectures at any of the great schools of medicine in the United Kingdom. . . . In the science of health there are more exact, demonstrable truths than in the science of disease; and the advantage of "prevention" over "cure" requires no proof. In the Cyropædia of Xenophon, physicians who only treat the sick are compared to "menders of torn clothes," while the preservation of health is declared a noble art, worthy of Cyrus himself.

It is fortunate, indeed, that not only has the general public advanced today far beyond this stage, but physicians have led in teaching that *prevention* is better than *cure*.

Sanitary education, already mentioned as occupying an important part in present-day institutions, was wisely and strongly urged in another recommendation of the same Commission, as follows:

We recommend that persons be specially educated in sanitary science, as preventive advisers as well as curative advisers. . . . Sanitary professorships should be established in all our colleges and medical schools, and filled by competent teachers. The science of preserving health and preventing disease should be taught as one of the most important sciences. It would be useful to all, and to the student in curative medicine as well as to others. To the young man who is educating himself for the great purposes of life, whatever profession he may select, it cannot be inferior, in interest and importance, to any other branch of education.

Today we have in some states advanced even beyond the point of view of the Massachusetts Sanitary Commission, and Massachusetts, Ohio and several other states, with the simple requirement of "seven or nine persons," to be appointed to the State Board of Health, lead in the democracy of this service. Where some restriction is considered desirable, New York

has given an admirable model, in requiring that the commissioner of public health shall be "of skill and experience in public health duties and sanitary science,"—although the additional restriction that he shall be an experienced practising physician appears less advantageous. Some states, notably Massachusetts, New York, Pennsylvania and Ohio, have taken an advanced stand, more by practice than because of definite legislative enactment, in recognizing the wisdom of having a competent engineer in charge of an important branch of the service.

Many of our states, however, still lag behind and retain on their statute books requirements inherited from the days before the dawn of modern sanitary science. The appendix shows a tabulation of the legislative enactments, as found in the latest copy of the state laws, relating to eligibility for appointment or election to the State Board of Health, and to the position of executive officer of the State Board of Health, in all states of the Union. For convenience this table has been confined to state service, but an examination of any of the local health service laws shows the same restriction and the same lack of uniformity.

A study of the table indicates that a considerable majority of the states still require that some or all of the members of the State Board of Health, and the state health officer, shall be physicians, and brings out the following facts:

In fifteen states all members of the state boards of health (leaving out one or two ex-officio members, as governors and attorney generals, in a few cases) are required to be physicians. Twenty-three states require one or more, but not all members of the state board of health to be physicians. In ten states there is no professional requirement for eligibility.

Stating this in another way, and excluding Alabama and South Carolina, where the State Medical Associations are the state boards of health, out of 298 members of state boards of health the eligibility requirements are as follows:

172	must be physicians;
7	must be engineers;
1	must be lawyer;
1	(preferably) lawyer;
1	must be live stock breeder;
8	Attorney-Generals ex-officio;
4	Governors ex-officio;
1	State Veterinarian ex-officio;
1	Commissioner of Agriculture ex-officio;
1	State Engineer ex-officio;
1	Commissioner of Education ex-officio;
100	No requirements.
Total, 298	

Out of 46 executive officers of state boards of health (variously called commissioners, secretaries, superintendents, presidents and state health officers) 32 must be physicians and 14 have no such requirement.

It should be said, however, that the medical profession, as an organization, is not responsible for this. In 1871, only two years after the establishment of the first State Board of Health in this country, the American Medical Association, in convention at San Francisco, adopted resolutions memorializing the legislature of each state, urging the establishment of a State Board of Health, and recommending as a model the Massachusetts plan of having seven appointive members, not necessarily all physicians.

Alabama, the first in the alphabetical roll of states, will be given more detailed consideration for the sole reason that it is believed to represent the best example of the medical monopoly fallacy carried to its ultimate limit. Under the present law in Alabama, first enacted in 1875, and amended several times since, the Alabama Medical Association is legally constituted the State Board of Health. This association, with a membership of over eighteen hundred physicians, meets once a year and elects an executive officer, known as the state health officer, who, with the State Committee of Public Health (the Board of Censors of the Medical Association) supervises and directs the administration of the public health laws of the state, during intervals between meetings of the association.

The County Medical Associations are legally constituted County Boards of Health, and no other local boards of health are permitted. The county boards elect the county health officer, and the health officer for each incorporated city and town. The county health officer is eligible for election as health officer of any one or more cities or towns.

To understand fully this plan of organization, a knowledge of the organization of the State and County Medical Associations is necessary. All the officers of the State Association, including the state health officer, must be chosen from the college of Counsellors. The membership of this body is limited to one hundred, exclusive of "Life Counsellors," who have served as counsellors for twenty years. Some of the requirements for eligibility as counsellor are five years membership in the association, and "fidelity to the system of organization embodied in this Constitution."

Counsellors, to fill vacancies, and all officers (except the state health officer) are nominated by a nominating committee, which must be composed of "Senior Counsellors," who have served as counsellors for ten years. Elections and all formal actions of the association, are by vote of the counsellors and the delegates. Each County Medical Society (whatever its membership) is entitled to two delegates, who are not eligible for office or appointment to the nominating committee. Members cannot vote or hold office. Counsellors hold their position "until removed by death, resignation, impeachment, or neglect of duty."

A board of censors, consisting of ten counsellors, nominated and elected as are other officers, acts as a general commitee of the association, and as the state committee of public health. It elects the state health officer, subject to confirmation by vote of the counsellors and delegates. It is also the State Board of Medical Examiners. Meetings of the association are held annually, and amendments to the constitution must be presented at one annual meeting, and cannot be voted on until the next.

The County Medical Associations are organized along similar lines, except that there are no counsellors or delegates, election being by open ballot. A board of censors, of five members, each elected for five years, acts as a general committee for the association, and as a county committee of public health.

Narrowness of scope; incompleteness of work from the broader sanitary point of view; emphasis on *cure* rather than *prevention;* and insufficient realization of the importance of reliable statistics may well result from so remarkable and oligarchical plan of organization. It is believed that every state would benefit by removing the restriction of the public health service to the medical or any other profession, and by securing the men best qualified by training, experience, wisdom and judgment; as determined by civil service, record of public service and practical achievement, by responsible appointment, and by other suitable means. It is hoped that this presentation will stimulate a discussion upon this important subject of public policy.

APPENDIX.

STATUTORY PROVISIONS REGARDING ELIGIBILITY AND SELECTION OF MEMBERS AND EXECUTIVE OFFICERS OF THE STATE BOARDS OF HEALTH, IN THE SEVERAL STATES.

State.	State Board of Health.			Executive Officer (President, Secretary or Commissioner).		Remarks.
	Number.	Eligibility Requirement.	How Chosen.	Eligibility Requirement.	How Chosen.	
Alabama		Alabama Medical Association is constituted State Board of Health.		Must be counsellor of association and therefore physician.	Elected by board of censors.	Board of Censors of ten acts as State Committee of Public Health.
Arizona	3	One (secretary) must be physician. Governor and attorney-general, ex-officio.	One appointed by governor.	Must be physician.	Appointed by governor.	
Arkansas	7	All must be physicians of different medical schools.	Appointed by governor.	Must be physician.	Appointed by board.	Board advisory in function.
California	7	Must be physicians.	Appointed by governor.	Must be a member of board and therefore physician.	Elected by board.	
Colorado	9	No requirement.	Appointed by governor.	No requirement.	Elected by board.	
Connecticut	7	Three must be physicians; one must be lawyer.	Six appointed by governor; one (secretary) elected by others.	No requirement.	Elected by other members.	
Delaware	7	Must be physicians.	Appointed by governor.	No requirement. See remarks.	Elected by board.	Secretary may be member of board.
District of Columbia.				Must be physician.	Appointed by Commissioners of district.	
Florida	3	No requirement.	Appointed by governor.	Must be physician.	Appointed by board.	
Georgia	12	Majority must be physicians.	Eleven appointed by governor. One (secretary) elected by appointees.	Must be physician.	Elected by other members.	
Idaho	5	Three must be physicians. Attorney-general and state engineer, ex-officio.	Two appointed by governor; one elected by other members.	Must be physician.	Elected by other members.	
Illinois	7	No requirement.	Appointed by governor.			
Indiana	5	One (secretary) must be physician.	Four appointed by Board of Appointment; one (secretary) elected by appointees.	Must be physician.	Elected by other members.	

APPENDIX—*Continued.*

State.	State Board of Health.			Executive Officer (President, Secretary or Commissioner).		Remarks.
	Number.	Eligibility Requirement.	How Chosen.	Eligibility Requirement.	How Chosen.	
Iowa	10	Seven must be physicians; one must be civil engineer; attorney-general, and state veterinary surgeon, ex-officio.	Eight appointed by governor.	Must be physician.	Elected by board.	
Kansas	10	Nine must be physicians; one, preferably attorney.	Appointed by governor.	No requirement.	Elected by board.	
Kentucky	8	Must be physicians.	Seven appointed by governor; one (secretary) elected by other members.	Must be physician.	Elected by other members.	
Louisiana	7	Must be physicians.	Appointed by governor.	Must be member of board.	Designated by governor.	President is executive. There is also a secretary, not a member of board.
Maine	7	No requirement.	Six appointed by governor; one (secretary) elected by other members.	No requirement.	Elected by other members.	
Maryland	7	Four must be physicians; one civil engineer. Attorney-general and Baltimore commissioner of health, ex-officio.	Three physicians and engineer appointed by governor. One (secretary) elected by other members.	Must be physician.	Elected by other members.	
Massachusetts	7	No requirement.	Appointed by governor.	No requirement.		
Michigan	7	No requirement.	Appointed by governor.	Must be member of board.	Elected by board.	
Minnesota	9	Must be learned in sanitary science.	Appointed by governor.		Elected by board.	Secretary may or may not be member of Board.
Mississippi	13	Must be physicians.	Appointed by governor. Five on recommendation of State Medical Association.	Must be member of board, therefore physician.	Elected by board.	Mississippi State Medical Association and all other State, County and District Medical Societies affiliated with its purposes are styled "State Department of Health."
Missouri	7	Five must be physicians.	Appointed by governor.			
Montana	7	Four must be physicians; governor, state veterinarian, and attorney-general, ex-officio.	Three physicians appointed by governor; one physician (secretary) elected by other members.	Must be physician.	Elected by other members of board.	

Nebraska	7	Four must be physicians; governor, attorney-general and superintendent of public instruction, ex-officio.	Four appointed by governor.	Four secretaries must be physicians.	Appointed by governor.	
Nevada	3	Two (president and secretary), must be physicians.	Two (president and secretary), appointed by governor. One appointed by governor, president and secretary.	Must be physician.	Appointed by governor.	
New Hampshire	6	Three must be physicians; one must be civil engineer: governor and attorney-general, ex-officio	Four appointed by governor.	Must be physician.	Elected by board.	Secretary may be a member of board.
New Jersey	6	One (secretary) must be physician.	Appointed by governor.	Must be physician.	Designated by governor.	
New Mexico	7	Must be physicians.	Appointed by governor from list furnished by New Mexico Medical Association.			
New York				Must be physician.	Appointed by governor.	"Of skill and experience in public health duties and sanitary science."
North Carolina	5	Four must be physicians; one must be sanitary engineer.	Physicians elected by North Carolina State Medical Association. Engineer appointed by governor.	No requirement.	Elected by board.	
North Dakota	3	No requirement.	Appointed by governor.	No requirement.	Appointed by governor.	
Ohio	8	Attorney-general ex-officio.	Seven appointed by governor.	No requirement.	Elected by board.	
Oklahoma				No requirement.	Appointed by governor.	
Oregon	7	Must be physicians.	Six appointed by governor. One (secretary) elected by other members.	Must be physician.	Elected by other members.	
Pennsylvania	6	Majority must be physicians. One must be a civil engineer.	Appointed by governor.	Must be a physician.	Elected by board.	Board advisory in capacity. Executive officer is commissioner.
Rhode Island	8	Five must be physicians.	Seven appointed by governor. One (secretary) elected by other members.	Must be a physician.	Elected by other members.	

APPENDIX—*Concluded.*

State.	State Board of Health.			Executive Officer (President, Secretary or Commissioner).		Remarks.
	Number.	Eligibility Requirement.	How Chosen.	Eligibility Requirement.	How Chosen.	
South Carolina		South Carolina Medical Association with attorney-general and comptroller-general constitute State Board of Health. Represented between meetings by executive committee.		No requirement.	Appointed by governor on recommendation of executive committee.	Executive committee consists of seven physicians, appointed by the governor on recommendation of the Medical Association, together with the attorney-general and the comptroller-general, ex-officio.
South Dakota	5	Must be physicians.	Appointed by governor.		Elected by board.	
Tennessee	5	Three must be physicians. One must be a livestock breeder. State commissioner of agriculture, ex-officio.	Four appointed by governor.	Must be a physician.	Elected by board.	
Texas	7	Must be physicians.	Appointed by governor.	Must be a member, therefore physician.	Designated by governor.	
Utah	7	Majority must be physicians. One must be a civil engineer.	Appointed by governor.			
Vermont	3		Appointed by governor.	Must be a physician.	Elected by board.	
Virginia	12	Must be physicians.	Appointed by governor.	"Shall be versed in bacteriology and sanitary science."	Appointed by governor.	
Washington	5	No requirement.	Appointed by governor.	Must be physician.	Elected by board.	Secretary may or may not be member of board.
West Virginia	10	Must be physicians.	Appointed by governor.	Must be member of board.	Elected by board.	
Wisconsin	7 or 8	No requirement.	Seven appointed by governor.	No requirement.	Elected by board.	Secretary may or may not be a member of board, but if not becomes so on election.
Wyoming	3	One (secretary) must be a physician.	Appointed by governor.	Must be a physician.	Appointed by governor.	

NOTE.—Eligibility requirements refer only to professional requirement, if any; thus, "no requirement" does not mean that there may not be some requirement regarding geographical distribution of appointments, etc.

A PLEA FOR A MORE GENERAL RECOGNITION OF THE QUALIFICATIONS OF THE SANITARY ENGINEER FOR ADMINISTRATIVE PUBLIC HEALTH WORK.

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Read before the Sanitary Engineering Section, American Public Health Association, Washington D. C. September, 1912.

The rapid increase in knowledge relating to public health matters in general during the past few years has brought about a new condition of affairs in health board administration that is only just beginning to receive the recognition that must eventually be given to it by state and local health boards. Until very recently practically the only real work of the majority of health boards was the supervision of cases of and the suppression or attempted suppression of epidemics of communicable diseases. In fact, many health boards apparently believed that this was their only function and that this function related only to the direct, personal-contact phase of the matter and not to the various indirect means by which diseases may be spread.

In view of this apparent attitude towards the work that fell to health boards it was only logical that the executive officer should be chosen from the ranks of the medical profession. At the present time it is the law in many communities that the health officer shall be a physician. The inconsistency of a law of this kind is apparent when we consider for a moment the complexity of the work undertaken by an active, up-to-date health board. In addition to the duties required in connection with the direct control of communicable diseases, which branch of work will always be one of the primary functions of health boards, the modern health officer is required to supervise (1) the control of the city milk supply, with the large number of inspectors, veterinarians and analysts that that work requires, especially in the larger cities; (2) the inspection of factories, markets, stores, schools, theaters, tenement houses, lodging houses, bakeries, etc.; (3) the food and drug inspection service, with its inspectors and chemists; (4) the general sanitary inspection service of the city; (5) the protection of the public water supply, and prevent or remove sources of pollution; (6) the collection and disposal of garbage and other household wastes; (7) all other departments, including infant welfare and vital sta-

tistics; (8) the enforcement of the health ordinances of the city. A health officer is expected to be able to interpret the results obtained by the various chemists and analysts in his department, so as to advise his board as to the proper methods for it to follow. He will also be called upon to confer with the other city officials on matters that pertain to the general welfare of the community, in addition to the new questions that will continually come before him in his own department.

From this summary of some of the duties that belong to the administrative public health officer it should be apparent that a physician is no more fitted by his education for this position than the sanitary engineer. In the first place the position demands a man of executive ability. Without this qualification no one can make a success of the work, regardless of his general professional ability. Of two men who have equal executive ability the one should be chosen who is best fitted by his training to thoroughly understand how to deal with the greatest number of matters that will probably come before him for action during the discharge of his duties. An argument in behalf of a medical health officer is that he can seek the advice of expert sanitarians along the non-medical lines of his work whenever occasion arises. Is not the argument much stronger that a sanitary engineer, who by training is fitted for all but the medical lines of public health work, can seek the advice of medical men whenever occasion may arise, especially where, in the larger cities, medical men are in the employ of the health department, for it must be admitted that the purely medical side of administrative public health work is small in comparison with the total activities that should be undertaken by a health department.

The fact that doctors are trained from the standpoint of curing people of diseases rather than from the standpoint of preventing the transmission of diseases by general public health measures has already been recognized in New York State, where arrangements have been made by all of the medical schools to give a course in public health and sanitation. This will better prepare a physician for public health work than a course in the practice of medicine alone. The majority of physicians at the present time, however, have had no such training. The sanitary engineer, on the other hand, has received a liberal training by education and professional practice that will enable him to cope effectively with the majority of public health problems. He has had training (1) in all phases of public water supply problems, such as construction and operation of plants, analyses of the water, interpretation of results, special treatment of the water in case of emergencies, etc.; (2) in the design and construction of sewerage systems and proper methods of treatment of sewage in order to obtain the necessary degree of purification for the disposal scheme that must be adopted; (3) in the design and proper methods of operation of refuse disposal plants; (4) in chemistry and bacteriology, so that he is able to interpret the results

of food, water and air analysis, or even to make the analyses himself; (5) in diagnostic bacteriology; (6) in a general way, in the entire branch of measures for the control of communicable diseases; and (7) in a general way, with the work of all of the departments of inspection that come under the control of a city health department.

If we consider the science of public health and sanitation as a composite science made up of the science of bacteriology, the science of sanitary engineering and the science of the practice of medicine, it is an undisputed fact that our executive health officials can not be chosen from the ranks of those who are experts in all three of these sciences. The attempt has been made to present the matter in such a way that it would be evident that the expert in the branch of public health known as the science of sanitary engineering is just as competent for a position as an executive health officer as the expert in the science of the practice of medicine. If this fact can be impressed upon the health boards throughout the country a more efficient health officer will probably be secured in many communities where the custom in the past has been to engage a physician, but where it is often impossible to secure a satisfactory man with the funds available, for the reason that a first-class physician can not afford to give his entire time to the work. Moreover, a practicing physician is often obliged for self-protection to be less vigorous in persecuting certain public health measures than a man who devotes his entire time to the work of the health department. If a sanitary engineer is placed in charge of the health department he has no outside work for which he has to sacrifice the efficiency of the department, but he is engaged in work that is exactly in line with his professional training.

In conclusion, it should be stated that many physicians have had the natural executive ability and the training so that they have made most excellent health officials. The object of this paper is not to decry the ability of the members of the medical profession for administrative public health work, but to show that the sanitary engineer should be recognized as standing on as high a plane as the physician, in so far as his ability for administrative public health work is concerned.

DISCUSSION OF THE PAPERS OF MESSRS. MORRIS KNOWLES AND C. H. WELLS.

MR. H. P. EDDY: Mr. Knowles has very clearly set forth the conditions under which the various State Boards of Health are appointed, or elected, in the several states of this country, in the compilation of data in the appendix to his paper, and has described in a very interesting manner some of the features of the laws in the various states. It seems to me, however, that there is one point which is of vital importance, but which the author has not dealt with as fully as might be desired, and therefore I wish to call attention to the importance of selecting health officials, as well as many other city and state officials, with a view to their fitness for the position, rather than their political alliances. The unwritten law that appointees to local and State Boards of Health be appointed from within the community under consideration, is almost universal. It therefore frequently happens, and is not to be surprised at, that a municipality does not find residing within its borders, specialists educated and trained in this branch of public service. Under such conditions, it becomes a question as to whether the appointee shall be selected from a neighboring or distant community, and tendered the office, because of his professional fitness, or whether the so-called political "plum" shall be handed to a resident, and thereby furnish patronage to the administration.

When one compares conditions affecting the appointment of public officials abroad, as in Germany and England, and notes that very important officials, as mayors and engineers, are taken sometimes from a distant part of the country and given offices because of their natural ability, their technical training and their experience, it is easy to understand at least one important reason why municipal and state government in this country does not reach the high plane of efficiency obtained in some foreign countries.

Assured continuance in office is another important element in securing efficient administration of health boards. The writer has been personally acquainted with a health officer who, if his recollection is correct, was at one time a machinist, and yet because of long years of service in this department, he has become, and is now a most efficient official. While the municipality will undoubtedly be the gainer by appointing in the first instance, a man properly educated and trained by years of experience, yet lack of these qualities may in large measure be overcome by assuring continuance in office and freedom from political influence, so that effective service may be rendered.

It is certainly to be hoped that health boards will in the near future, be so organized as to attain more nearly to the ideals of efficiency mentioned and applied in the author's paper, and that officials acting under these boards will be appointed because of their education and practical training, and not merely because they happen to be local residents and voters.

DR. W. S. RANKIN: I regret that, on account of having a part on the program of another Section, I failed to hear Mr. Knowles' paper and most of its discussion; nevertheless, under the discussion I would like to say that, in my opinion, no profession has a monopoly on the production of health officers. I think if we shall accept as a definition of a health officer, qualifications of such an official based entirely upon an essential in his make up, we shall readily see that no profession—medical, engineering or even the laity can be barred in the selection of health officers. My definition of a health officer is, a man who reduces high death rates or maintains a low death rate.

It is all important that the general public grasp this idea so that when they entrust their health affairs to a real or supposed health officer, they may be able to retain the one or eliminate the other by noting his influence on their death rates after a reasonable length of time.

COL. W. F. MORSE: The papers presented by Mr. C. H. Wells of Montclair and Mr. Morris Knowles of Pittsburgh indicate the rapid advance being made in public health administration

work on the side of sanitary engineering, and afford a measure of the value of engineering services as compared with the medical service of the municipal health officers.

When three years ago at the meeting of this association in Richmond, the speaker brought forward a resolution for the organization of a sanitary engineering section, it was for the purpose of more accurately defining the status of many members of the American Public Health Association who were engineers and who were not then attached to any of the sections. It was felt that the engineering side of public health work demanded more recognition than had heretofore been given it, and if a section of engineering were added, many men whose work is intimately connected with public health affairs, would willingly add their names, and bring to the association the benefit of their knowledge and practical acquaintance with the many questions that arise in sanitary engineering.

These papers are indicative of the line of work to be carried on by engineers in connection with the medical profession, not as rivals or opponents, but acting entirely in coöperation with the medical health officers on lines of work in which skilled and expert engineering services are required, and which are not, as a rule, from the education or experience of medical officers, within their province of work.

These lines, including sewage disposal, water analysis and purification, refuse collection and disposal, and other allied branches, come properly under this division of sanitary engineering. For many years past, the speaker has been intimately connected with one branch of this service,—refuse collection and disposal, and has recognized the inability of municipalities to deal with this subject in many different phases except by employing the services of engineers. The collection of refuse and its disposal has been in the hands of medical officers for a long period of time, and owing to their limitations in experience, many mistakes have been made, and large sums of money expended uselessly. It is believed that the time has come when questions affecting the design, construction and operation, of plants for the sewage, water, and refuse of municipalities, should be placed under the charge of men trained in education and experience to more efficiently conduct and carry on these divisions of municipal work.

The subject is one which interests not only members of this association, but the large number of engineering classes in the several universities and colleges where the younger men are being trained in general engineering work. It has been the privilege of the speaker to present this question before the engineering classes of several universities,—Cornell, Columbia, Yale and others,—and there has always been found a very great interest and anxiety on the part of students to obtain a knowledge of fundamental principles underlying certain special classes of engineering, as for instance, refuse collection and disposal. It was pointed out that this is a coming question; that these men are the ones to whom the municipalities shall look in the future, and even a slight acquaintance with the principles of the subject in the beginning would afford them opportunities which might not otherwise arise.

We may contrast the somewhat inefficient method of training on this subject in America with the way in which the question is taken up in Great Britain. There, a class of men are trained in all questions of sanitary engineering affecting municipalities; pass through a series of competive examinations, and are appointed and retained in office as the authorities in charge of a class of municipal health work quite distinct from the medical officers. These men expect to make this their profession, are anxious to excel in all branches of their work, and form a strong and efficient corps of men at the service of the municipalities. Some such training as this, either by the aid of our universities and colleges, or through the officers of our State Health Boards, will be an invaluable asset in forwarding this work in the future.

The papers under discussion are of great value and assistance in pointing out lines of sanitary engineering upon which the future public health work will be carried on, and show that the sanitary engineers come to the aid and assistance of the medical officers, operating on distinct and well-defined lines without interference with medical questions, and afford the municipalities a much needed help in carrying out the sanitary reforms, and practical administration of purely business matters.

A medical officer who has been trained in sanitary engineering, and able to decide questions involving an expert knowledge of sewage water, refuse, gas and other municipal questions, is of a great deal more service as a health officer than as though he were limited solely to the administration of the purely medical side of health work in his locality. A sanitary engineer, who has also had the necessary training for the administration of purely routine medical work, possesses greater advantage over one who has not had this preparatory training, is far more competent to fill all the offices of a municipal health and sanitary officer than one who has not had these advantages, and is of consequent greater value to the municipality.

MR. PAUL HANSEN: In the light of Mr. Knowles' very able presentation of the necessity of having in our public health service adequately trained experienced and paid men it would seem advisable that the American Public Health Association should lend its aid in some form toward the improvement in the personnel of boards of health and employees of these boards for it must be admitted that, after all, personnel lies at the very basis of any advance in public health and the science of sanitation.

MR. SAMUEL A. GREELEY: The papers presented by Mr. Wells and Mr. Knowles are very good. There is one point, brought out by the chairman, Mr. Hering, which is interesting in this connection; that is, the proper division of public health work. Mr. Hering emphasized the distinction between that phase of public health work which deals with the conditions and that phase which has to do with the construction of works to improve these conditions. This is important. Some work along this line was done in Milwaukee by the Bureau of Efficiency and Economy. This Bureau was established about three years ago to make a study of the operation of the various departments in the city hall. They first made a classification of the different operations carried on by these departments. They found, in particular, that the Health Department was doing some things that should properly have been done by the Department of Public Works. The scheme of reorganization, which they proposed, restricted the work of the Health Department to those lines of public health activities more closely associated with medical, educational and laboratory work. They proposed the appointment of a city sanitary engineer to carry out the work as recommended by the Health Department.

PROF. C.-E. A. WINSLOW: I am sorry that several of the medical health officers who were down on the program are not here for their contribution to the discussion would have been of special value.

It seems to me that the prime requisites for the health officer are that he should be an administrator and that he should be conversant with the fundamental principles of public health science. Public health is a very broad field and he cannot be a specialist in all its subdivisions. In any given case the best man may have begun as a chemist like Doctor Lederle of New York or as a physician like Doctor Young of Chicago or as an engineer like Mr. Vogelson of Philadelphia; or he may have been a bacteriologist to start with, or a statistician. In each case, however, the important thing is that he should have mastered the essentials of the whole problem and that he should have the ability to organize and inspire his whole corps of experts in their various lines.

I believe that in general the medical phases of public health work are likely to be more and more the dominant ones. Other things being equal, I should much prefer a man who was a medical man as well as a public health man, to one who had had either kind of training alone. On the other hand, I should much prefer a man who knew public health and not medicine to one who knew medicine but not public health; and this is the alternative with which one is frequently confronted. That is the reason why the New Jersey towns, Montclair and Orange and Elizabeth and Princeton and Plainfield, have placed young sanitary engineers in charge of their health departments. It was a practical condition which confronted them. They had local doctors but these doctors were not trained in sanitary science. So they turned to the Massachusetts Institute of Technology and got engineers who *had* been trained by Sedgwick, in sanitary science. And those young engineers have one and all made good. As a matter of

fact there is a great dearth of men who are acquainted even with the broad principles of sanitary science and there is a still greater dearth of men who have this fundamental knowledge and are at the same time personally qualified for administrative public health positions. There are few offices which require a rarer combination of ability and courage and wisdom and tact, than that of health commissioner and in order to secure a man who measures in any way up to our ideal standard, I believe we should free ourselves as much as possible from professional or geographical limitations and should be free to pick the best available man for the place in whatever lines his education and experience may have lain.

Dr. W. H. Sanders of Alabama: Without undertaking to follow in detail the line of argument pursued by the Leader in support of his theme, the burden of his argument may be reduced to three propositions:

1. That medical men are maintaining a monopoly on public health service.

2. That provision should be made by law for rendering sanitary engineers eligible for membership on boards of health and for the position of health officer.

3. That in Alabama is to be found "the best example of the medical monopoly fallacy carried to its ultimate limit," quoting the words of the Leader.

In answer to the first proposition, which asserts that medical men hold a monopoly on public health service, some words of the *Leader* may be quoted with great force.

After emphasizing the fact that the "noble structure of modern sanitary science as it exists today," again quoting from the paper, has been built up by the medical profession, the Leader pays a high tribute to the profession for its work in this field, and denominates it a "superb example of altruism . . . public service . . . and scientific research." If the profession is entitled to this high compliment, why complain that it holds a monopoly? Instead of making such a charge would it not have been more in harmony with justice and good policy had the Leader entered a plea for giving the profession larger facilities and powers for still further building up what he calls "the noble structure of modern sanitary science?" If monopolies bear such fruit as the Leader freely concedes to the one he alleges the medical profession holds, would it not be wise policy to encourage, rather than to discourage, them?

The medical profession does not deny to any man, nor to any set of men, the right of promoting the public health in any way that is legitimate and legal, and no one more than medical men themselves welcomes the advances made in sanitary engineering, or is readier to profit by the expert knowledge of sanitary engineers.

How this expert help from sanitary engineers may be best secured brings us to the discussion of the second proposition, to wit, that provision should be made by law for placing sanitary engineers on boards of health and in the position of health officer.

The principle of division of labor underlies all social organism and all civil government. Applying this principle to the affairs of life, the medical profession believes that "public health service," to use the words of the Leader, lies more legitimately in its field of work than in that of any other class of citizens, or of any other profession. In the very nature of things this must be so, therefore, in undertaking to do work that rightfully belongs to it the medical profession does not concede that it is maintaining a monopoly. Just as well charge lawyers and preachers with maintaining monopolies because applicants for admission to the bar, or the pulpit, must qualify themselves in all departments of law, or of theology, not merely in one department.

Grant that sanitary engineers are qualified in one department of health administration to fill the positions claimed for them by the Leader, does that entitle them to fill all departments of public health administration? The expert help of sanitary engineers may be needed in almost any business or profession, and when needed is always sought for, but does that necessity create a right for these engineers to assume charge of such business or profession? The commander of an army, or of a navy, employs engineers, but does any "provision of law" exist for putting them in command of lines of battle on land or sea? A court may in adjudi-

cating a case find it necessary to place engineers, sanitary or otherwise, on the witness stand, but should any "provision of law" exist for putting these engineers on the bench, or in the jury box? A farmer may employ an engineer to drain, or to irrigate, his land; would that create any right for such engineer to be placed in control of the farm, although greatly improved by his skill? The president and directors of a great corporation may employ engineers of various kinds, but should any "provision of law" exist for entitling such engineers to preside over the corporation, or to sit in its board of directors?

Is not the relation of sanitary engineers to "public health service" precisely parallel to the relations existing in the other services cited? If so, where is the reason or consistency in the Leader's demand for such legislation as would provide special privileges for sanitary engineers as respects their relation to "public health service"?

In Alabama we believe that boards of health should consist of physicians, and, as the Leader told you, we adhere practically to that belief, but we at the same time believe that such boards should avail themselves of the expert knowledge of sanitary engineers, of lawyers, chemists, or men of other callings, whenever such help is needed.

As the executive officer of the board of health of my state, I will say that for years I have desired to see a sanitary engineer attached to, but not a member of, the board, and as soon as a financial obstacle that has hitherto existed disappears I doubt not that this will be done.

In states in which mixed boards of health are the established policy no objection could be alleged against sanitary engineers serving on such boards; on the contrary, it is freely conceded that they would make more competent and more desirable members perhaps than any other non-medical men, but the principle of mixed boards is the one against which objection is made. Time does not permit of extended argument on the question of mixed boards, consequently, one reason only against such boards will be offered and that will be put largely in the shape of a mere affirmation. In constructing a public health system it is of the highest importance that the system be divorced from politics and commercial influence. This cannot be done if health officials be elected by popular vote, or by a legislature, or if they be appointed by the governor of a state. Turn the problem of the election, or appointment, of health officials over as you may, it will be seen that the only practical or possible way of absolving such elections, or appointments, from political or commercial domination is to concede to a thoroughly organized medical profession the right of electing these officials.

This plan posseses another great advantage, namely, it places the election of these officials in the hands of those most competent to judge of their fitness and efficiency. Were the lawyers of a state thoroughly and logically organized would they not make the best possible electors for naming the judges of the state, from the lowest to the highest? Does not the same principle apply to men of all businesses and professions?

The training of biologists, chemists, pharmacists and veterinarians is more or less closely related to that of physicians. Following out the reasoning of the Leader men belonging to all of these callings might demand such legislation as would entitle them to administer the public health affairs of a municipality, a county, a state, or of the nation.

Sanitary engineers have a field peculiarly their own, one that is rich in opportunities for usefulness. Their services in this field are sought after, and I may say are more liberally rewarded than are the services of medical health officials. It would seem therefore wisdom on their part to adhere to their own field and not attempt to occupy another field for which they are qualified in part only.

Let us analyze for a moment the qualifications of a sanitary engineer for the position of health officer.

A health officer should first be a physician, then, a sanitarian. It is far easier for a physician to acquire the practical sanitary knowledge necessary to equip him for the position of health officer than for a sanitary engineer to acquire the scientific medical knowledge necessary to

equip him for the position of health officer. In fact, the former is comparatively easy, the latter, impossible.

To diagnose diseases and to differentiate between those that appear to closely resemble is one of the most important and essential functions of a health officer. Without this ability sanitary knowledge, however great, would be of no value whatever to a health officer; he would not know when, nor where, nor how to use it. He would be in the position of a man in charge of a mogul engine, or of an ocean steamer, who knows nothing of how to operate the former, or to navigate the latter.

Imagine the dilemma of a graduate of one of those "educational institutions" which the Leader says "are now training men especially for the new public health service" when confronted with a problem in diagnosis involving a differentiation between yellow fever and dengué or, between yellow fever and hemorrhagic malarial fever; or, between typhoid fever and incipient tuberculosis, or an estivo-autumnal type of malarial fever; or, between smallpox and a pustular syphilide?

For the reasons given, and others that might be given, the line should be very sharply drawn that would deny to sanitary engineers the right of occupying the postion of health officer.

It would be just as impossible for a sanitary engineer to do the work of a health officer as it would for a health officer to do the work of a sanitary engineer; each has his legitimate field and his limitations, which it would be wisdom on the part of both to respect. They should be coadjutors, not competitors, then, their coöperative work would immensely advance the sanitary interests of the people.

We have now arrived at the third and last proposition of the Leader, namely, that in Alabama is to be found "the best examply of the medical monopoly fallacy carried to its ultimate limit."

One who understands the philosophy and the logic of the public health system of Alabama finds it difficult to restrain a feeling of amusement at the recklessness of such an allegation. Charity comes to the rescue, however, and suggests that a man who mounts a hobby, as the Leader evidently has done, is utterly blind to every other virtue a public health system may possess save the one he has chosen for his steed. I am glad the Leader used such strong words, for he may have thereby captured your attention, and, if he did, I feel sure you will do me the courtesy to give me your close attention for a few minutes while I point out to you that the "fallacy" lies in the charge made and not in the system charged. If it turn out that the Leader has thrown a boomerang, he must be responsible for results.

As has already been intimated the public health system of Alabama rests upon a philosophic basis and is logically built up from foundation to dome. It did not grow up by chance, or by laying down arbitrary rules; neither has it been built up by experiment, that is, by trying one plan and finding it unsuccessful, abandoning that and trying another. On the contrary, the system was conceived by the greatest thinker on medical organization and public health systems that this country has ever produced—Jerome Cochran—and then the plans were formulated by that great thinker himself with the same care and accuracy that a master architect employs in drawing the plans for a great temple. This done, the system was submitted to the State Medical Association and was debated by that body at three of its successive annual meetings before it was adopted. After adoption by the organized profession of the state the public health features of the plan were submitted to the legislature and enacted by that body into law. All this occurred more than thirty years ago, since which time the system has been in operation. Investigation of results is courted, and had the Leader applied at the office of the State Board of Health for information as to what has been accomplised, and as to what is in process of accomplishment, it is morally certain that he would not have issued such a vulnerable attack on the system as he has done.

With the time at disposal it is utterly impossible to do more than to make a somewhat categorical statement of the chief virtues of the system, leaving to you "to read between the lines" and see how much in support of the system may be supplied by your own initiative.

1. The system corresponds in construction with that of our state governments; that is, it fully recognizes the principle of local self-government by conferring upon the organized medical profession of the counties the right of enforcing public health laws in their respective territories, reserving to the state, however, the right of supervision, and in the last analysis of absolute control.

2. The system was predicated upon the idea and the expectation of bringing about the thorough and uniform organization of the profession in every county of the state, and, then, the coördination of these county organizations into one coherent and homogeneous state organization, all of which was accomplished a quarter of a century or more ago.

3. The objects of organization, as set forth in the constitutions of every one of the county societies and in the constitution of the state association, are:

(a) To cultivate the science and the art of medicine and to widely distribute the knowledge thus acquired among the members of the profession of the state.

(b) To uphold the ethics of the profession.

(c) To obtain and enforce a law regulating the practice of medicine.

(d) To perfect and administer a public health system that covers the entire state, and can be promptly and accurately put into operation whenever and wherever needed.

It may be safely affirmed that all of these objects are being achieved, the state having, as said, put upon them the seal of law.

4. County medical societies, to membership in which all reputable physicians in the county are eligible, are made by law boards of health for their respective counties, thus establishing *deliberative* health bodies, composed of men who are daily going in and out of the homes of the sick, therefore in close touch with the health conditions prevailing in their several territories and fully cognizant of the sanitary needs of the people.

These deliberative boards are supplied with executive officials from their own ranks and of their own choosing, which officials they may at any time remove for cause.

This arrangement gives every reputable physician who chooses to become a member of his county board of health a voice in shaping the public health policy of the county, and the right of seeing that public health work is efficiently done.

5. The State Medical Association, made by law the State Board of Health, consists of permanent members and of delegates from county medical societies, and is authorized, through its executive officials, whom it elects and can remove at pleasure, to supervise the enforcement of the health laws of the state by the county boards of health.

The State Board, like the county boards, is a *deliberative* body, with a state health officer, surrounded by an advisory committee of ten members of the State Board, actively engaged all the while in public health administration.

6. The system has resulted in the establishment of *one board of medical examiners only*, the members of which are elected by the State Medical Association, and before which board all applicants for a certificate of qualification to practice medicine, regardless of the school or sect of medicine to which they may belong, must appear, thus guaranteeing a uniform standard of qualification.

7. The system is absolutely divorced from politics and is independent of commercial influence, rendered so by the fact, already pointed out, that all executive health officials are elected by the organized medical profession.

After this presentation of the main features of the system will any one agree that the Leader's strictures are just, simply because, forsooth, provision has not been made for placing sanitary engineers on the boards of health of the state and in the position of health officers of counties, towns, and of the state? It has already been announced that the boards of health and health officers stand ready to call upon sanitary engineers for help whenever their services are needed, and whenever the people provide the means with which to remunerate them.

The Leader closes his paper with the following severe indictment:

"Narrowness of scope; incompleteness of work from the broader sanitary point of view; emphasis on *cure* rather than on *prevention*; and insufficient realization of the importance of reliable statistics may well result from so remarkable and oligarchical plan of organization." Did a volunteer authority on public health systems, one who possibly never participated in the practical administration of a public health system, ever reach qu'te such a pitch of captious and groundless criticism? Five assertions made in quick succession and not a word of proof offered for either one of them!

"Narrowness of scope," he says. It has already been pointed out that the one homogeneous and coherent system of organization in Alabama covers the following fields: The cultivation of the science of medicine and the distribution of the medical knowledge thus acquired; upholding the ethics of the profession; enforcement of the law regulating the practice of medicine; the practical administration of the public health system of the state. If this is "narrowness of scope" will the Leader be good enough to suggest in what directions the system may be broadened, and will he be accommodating enough to point out another state in the Union in which one and the same system of organization of the medical profession is endowed by law with corresponding amplitude of powers?

He next says, "incompleteness of work from the broader sanitary point of view."

Two things are indispensable in order to make sanitary work as complete and as broad as it might otherwise be. These things are money and sanitary knowledge. While it is humiliating to be compelled to admit that since a momentous event transpired under an apple tree, near Appomattox, Va., 47 years ago, the treasury of the State of Alabama, like that of many other Southern States, has been by no means overreplete, nevertheless, the admission is true. When, however, the explanation is made that this depletion has been largely due to the financial operations of a set of men who inundated the South, soon after the apple-tree episode, and seeing their opportunities of getting possession, through the negro vote, of state and municipal exchequers, they warmly embraced the opportunities and not only converted said exchequers into enormous vacuums, but piled up in place thereof colossal bonded debts that were highly creditable to their financial enterprise, it would seem that Alabama should not be so severely condemned by the Leader for not having conducted her sanitary operations on quite as broad a scale as states have been able to do that did not suffer similar invasions. No reflection whatever is intended for that other class of men who came into the South, bringing with them money, brains and strong hearts, and, identifying themselves with our people, helped, and helped heroically, to rehabilitate the wrecked South.

Further, the population of Alabama is largely a rural one, hence the same imperative necessity for conducting sanitary operations on a scale as broad as has been demanded in states where large aggregations of population are found does not exist. If the Leader will but exercise a little patience Alabama may after a while approximate his standard of broadness of sanitary operations.

The next count in the indictment is:

"Emphasis on *cure* rather than on *prevention*."

While we do plead guilty in Alabama of putting considerable emphasis on cure, and I dare say were the Leader critically ill in Alabama he would not object to such emphasis, yet perhaps he does not know that beginning with 1897, for four years out of five, when other Gulf States were extensively ravaged by yellow fever, their people smitten and dying, or flying; their commerce paralyzed; the wheels of their trade and traffic silent in many places; confusion and terror prevailing everywhere, Alabama was through the prompt enforcement of her splendid quarantine system completely protected from the scourge, her people serenely pursuing their occupations, her merchants reaping larger trades than usual, owing to the utter demoralization of trade in many of the marts of her neighboring states!

Was this no emphasis on prevention?

Compare the records of Alabama and other Gulf States as to the prevalence of yellow fever for those eventful five years and see whether Alabama was wholly oblivious to prevention?

Does the Leader know that a vigorous campaign against hookworm disease was put into operation in Alabama nearly three years ago; that the campaign has been carried very exhaustively through twenty-six counties and will be pushed into all of the other counties; that in round numbers 25,000 victims have been rescued from the disease, and that along with these *cures* efforts are being made to eradicate the infection by bringing about improvements in the sanitary conditions of not only the cities and towns but of every farmhouse in the state?

Is that putting all "emphasis on *cure* and none on *prevention*"?

In addition to this, the Leader is hereby notified that a campaign against tuberculosis, typhoid fever, pellagra and malarial fever will soon be put into operation in Alabama and carried, not only into every county, but into every neighborhood of the state for the purpose of educating the people as to the *prevention* of these diseases.

If nothing hitherto done is entitled to commendation by the Leader will not the completion of the campaign just mentioned mollify somewhat the severity of his arraignment of Alabama?

The fourth count in the indictment is: ". . . insufficient realization of the importance of reliable statistics." Could the Leader step into our department of Vital and Mortuary Statistics any day and see what is going on there; see how Alabama is climbing the hill of success in the collection of vital and mortuary statistics, with every prospect of soon reaching the summit and claiming her right to recognition as a registration state; could he see with what care and system the statistics gathered are being filed, so as to make them easy of access for all time to come; and could he know that the birth and death certificates obtained have been made by law *prima facie* evidence in any court of the state of the fact of such births and deaths; could he see reports of any one of the fifteen diseases made reportable by law coming in whenever present in any part of the state, I am sure he would quickly and cheerfully withdraw the allegation of "insufficient realization of the importance of reliable statistics."

We now come to the last count in the indictment, which, if possible, involves the Leader in greater disaster than any preceding one. The count is in these words:

". . . so remarkable and oligarchical plan of organization."

"Oligarchical!" How unfortunate the word; what a misfit when brought face to face with the facts!

Is there a place in the world outside of Alabama, where from fifteen physicians in the most rural county of the state to three hundred in the most populous, are authorized to meet as boards of health and deliberate on what may be done to improve sanitary conditions, and not only to deliberate, but to direct the work of their executive officials?

Is there a state in the United States, outside of Alabama, in which 234 voting members of the state Board of Health are authorized to meet annually, and oftener if emergencies so demand, to deliberate upon the general health conditions prevailing in the state and to exercise supervision over the execution of health laws by county and municipal authorities, with a state executive officer on duty every day in the year?

If boards of health composed of such numbers as those given constitute an "oligarchy" the query is what is a democracy? Did not the Leader reckon without his host when he applied the epithet "oligarchical" to the "public health system of Alabama?"

Evidently the Leader vainly imagined that he understood the public health system of Alabama and acting under that delusion he ventured to assail it in ugly fashion, the main motive of his assault appearing to be that provision is not made for placing sanitary engineers on the boards of health of the state, when, as has been more than once said, there is no desire or intention on the part of those boards to deprive the people of Alabama of the valuable services of sanitary engineers.

Not satisfied with simply suggesting the addition of sanitary engineers to boards of health in Alabama, the Leader assumes to pronounce wholesale condemnation of the system and warns other states to avoid it as they would infection.

Perhaps the system will crumble and fall under the attack of the Leader, or, perhaps the damage done will be accurately represented by that which would result from firing a pop-gun at Gibraltar. Time will no doubt arbitrate between these two alternatives.

In taking leave of the Leader's paper I do so with the utmost kindness and charity, feeling persuaded that had he understood the public health system of Alabama, instead of making it the object of a special and bitter attack, he would have given it his warm endorsement.

Closure by **Mr. Morris Knowles**:—

The author's hopes have been more than realized by the diverse and able discussions that have been presented. His belief is justified that the subject is one of general interest, and one needing consideration and clarification.

He will not attempt to contribute anything further but there is one misapprehension that ought to be corrected. One of the three propositions to which Dr. Sanders reduces the argument is "That provision should be made by law for rendering sanitary engineers eligible for membership on boards of health and for the position of health officers." This is, of course, a misstatement of the author's position, and the discussion thereon is to that extent in error. Such a provision would merely result in the substitution of one monopoly for another, and the author would combat as vigorously the proposal to legally limit public health service to sanitary engineers, or to doctors and sanitary engineers, as he does the present situation. A more correct statement of Dr. Sander's second proposition, and of the author's thesis would be "That provision should *not be made* by law for rendering *medical men alone* eligible for membership on boards of health and for the position of health officer."

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THE COLORADO SPRINGS MEETING.

The 1913 meetings of the American Public Health Association are to be held in Colorado Springs, September 9th to 13th inclusive. This will be the first time that the Association has assembled in this beautiful city and it behooves members to make their plans well ahead so that they may be able to be in attendance. There is no finer place than Colorado Springs and vicinity in which to spend one's vacation, and it is sincerely hoped that the splendid showing of the Association at the September 1912 meetings in Washington, will be equalled.

The Program Committees have already started on the preparation of strong and attractive programs for the General Sessions and the Section Meetings.

Past experience has demonstrated the value of well thought out and executed Symposia on topics of immediate importance, and the Secretary of the Association will appreciate suggestions from members as to subjects which are adapted to such discussion at the meetings.

The following gentlemen act as chairmen of the program committees and would be glad to receive suggestions at an early date concerning subjects for consideration:—General Sessions, Professor S. M. Gunn, 755 Boylston Street, Boston, Mass.; Laboratory Section, Professor Edward Bartow, University of Illinois, Urbana, Illinois; Section on Vital Statistics, Doctor J. E. Monjaras, Mexico, D. F., Mexico; Municipal Health Officers' Section, Doctor John H. Landis, Health Officer, Cincinnati, Ohio; Sanitary Engineering Section, Mr. R. S. Weston; 14 Beacon Street, Boston Mass.; Sociological Section, Doctor H. E. Dearholt, Goldsmith Building, Milwaukee, Wis.

Special attention of the members of the Association is drawn to the fact that it is no longer necessary for a person desiring to join the Association to have been employed for three years in the technical branches of public health work. Anyone interested in the objects of the Association who is properly endorsed by two members is eligible for membership. The Secretary will be glad to furnish application blanks and urges the co-opera-

tion of all in securing new members. Not only is this of supreme necessity on account of the financial aspects, but if the Association is to perform its true functions it must have the active participation of all whose aspirations and ideals are those of the Association.

USE AND ABUSE OF PUBLICITY.

The American Journal of Public Health has frequently urged the need of sane publicity in matters of hygiene and preventive medicine. The old order of mystery has passed and the more or less intelligent participation of the layman in the procurement of his own physical welfare is a fact. To make this participation as effective as possible is the object of the present public health movement and the responsibility therefor rests squarely upon the shoulders of the physician, the hygienist and the available agents of publicity of which the newspaper and magazine press of the country are by far the most important.

The dangers of the new dispensation have just been given a discouraging expression in the country-wide exploitation of the announcement of a new specific treatment for tuberculosis by Dr. F. F. Friedmann of Berlin. It is too soon at this writing to make any positive statement as to the value, or lack of it, of the reported "discovery." It is not too soon to denounce in unmeasured terms the irresponsibility of the news syndicate which has flooded the country, and particularly the West, with extravagant accounts of the "cures" accomplished in Berlin and which the most casual investigation shows to be still open to question and in the early stages of observation.

While the circumstances attending the announcement, and particularly the subsequent developments, make an unpleasant impression and are daily acquiring an increasingly commercial tinge, it is quite possible that Dr. Friedmann's work may contain a contribution of value and mark an advance in phthisiotherapy. From the meagre reports now available it would appear at least to fall within the field where we are justified in expecting progress. That it contains a discovery of a revolutionary kind there is no indication. However this may be, there is no worse cruelty than to rouse false hopes in the army of struggling consumptives and that bitter disappointment awaits thousands of eager sufferers is the strong probability in the present instance.

REVITALIZING DEVITALIZED CHILDREN.

AN OPEN WINDOW EXPERIMENT.

A COMPARISON BETWEEN THE PROGRESS OF PUPILS TAUGHT IN AN OPEN WINDOW CLASS-ROOM AND THAT OF THE PUPILS OF A PARALLEL GRADE TAUGHT IN AN ORDINARILY VENTILATED AND HEATED CLASS-ROOM IN THE SAME SCHOOL BUILDING.

WALTER W. ROACH, A.M., M.D.,
Supervising Medical Inspector, 4th & 5th Districts, Philadelphia.

The test was made at the Alexander Dallas Bache School, 22d and Brown Streets, Philadelphia, during the winter session of 1912.

After consultation with Mr. Walter C. Bishop, supervising principal of the above school and Mr. Albert H. Raub, district superintendent, it was decided to devote one class-room, with the heat cut off and the windows wide open, to teaching in nature's air with a minimum of artificial tempering, a normal third grade class the regular third grade work.

It happened that in this same school there was another class of equal number of pupils, of the same grade, occupying a room heated and ventilated in the ordinary way, so that we were able to keep accurate records and make a fair comparison.

In order that there should be no appearance of compulsion in the matter of attendance, the medical supervisor of the district first addressed a letter to the principal expressing the opinion that the stimulating effect of cool fresh air would benefit both pupils and teachers mentally and physically, and asked that some teacher in the school volunteer to teach the children through the winter with the class-room windows wide open. Happily there was no lack of volunteers and the problem of securing a willing teacher was solved.

The following circular was then addressed to the parents of about sixty of the third grade pupils, explaining the purpose of the movement and enclosing a blank application form to be filled out and signed by those who desired that their children be taught in this open window room.

BACHE SCHOOL, PHILADELPHIA, September 20, 1912.

To the Parents:—

Your attention is called to an open window class-room at the Bache School. Its purpose is to give Nature a greater opportunity to help our children to learn rapidly and to grow strong. The cold, fresh air of our

new class-room will be soothing to the nerves and stimulating to mind and body.

The occupants of this room will be protected in extremely cold weather with extra wraps and sufficient heat. They will not be subjected to draughts. They will be given exercise and freedom that is not possible in the ordinary class-room. Their physical welfare will be looked after constantly and noted regularly by the Medical Inspector. If you desire your child to be considered with others, as an applicant, please fill out and return enclosed blank.

Yours very truly,

WALTER C. BISHOP,
Principal.

Appended to the circular was the following quotation from a report on open air work.

"Fresh air increases the vitality of pupils and teachers, and makes them more alert mentally. Children taught in fresh air learn with avidity. They do not require perpetual reviews so common in hot air rooms. They are happier and grow more rapidly in cold air. The discipline of a class is reduced to its simplest problem. A cool humid air is soothing to the nervous system and removes the sources of ordinary friction among pupils, and between them and their teachers."

Upwards of fifty applications were received from parents, signifying their willingness to have their children enter the class and to have them weighed, measured and examined periodically, according to the following form:

APPLICATION

is hereby made to the Principal of the Bache School, 22d and Brown Streets for admission to an Open Window Class-room of

Name of pupil.....
Age.....Grade.....Address.....
Date.....Signed.....
Parent or Guardian.

PHYSICAL EXAMINATION

General Appearance.....
Height.....inches. Weight.....lbs. Chest.....inches.
Nose and throat.....
Lungs.....
Heart.....
Miscellaneous findings.....

NOTE.—A weekly health record, including weight and measurements, to be kept during the term.

Signed ....., School Inspector.
Endorsed ....., Medical Supervisor.
Approved for Admission ....., District Supt.

These children were then carefully examined by the school inspector; his findings reviewed and verified by the medical supervisor, and the recommendation for the admission of each child to the open window class-room was approved by the district superintendent.

EQUIPMENT.

Desk chairs were provided for routine class work in order that they be readily moved aside by the pupils to clear the floor space for physical exercise.

This freedom of desk movement also enables all children to be so seated that their eyes are properly protected from the unobstructed and unfiltered light.

Standard platform scales with measuring attachment for quickly and accurately determining height and weight were installed. Woolen blankets, sweaters, woolen caps and hoods, and knitted woolen gloves were also provided for use in exceptionally cold weather, to guard against disturbing the equilibrium of the circulation which might follow from the children sitting with their upper extremities in a stratum of air warmer than that to which their lower extremities were exposed.

The pupils were not fed at the school. None of them were tubercular children and we were not conducting an open air sanatorium for sick children. In all respects the room was equipped as the ordinary school-room except that it was shut off from the regular heating plant of the building, save on those rare occasions when it was found necessary to bring the temperature up to 50 degrees Fahr. The regular school program was followed during the term, with some modified physical exercise. We were using that which Nature furnished from day to day in the matter of fresh air and humidity, and setting an example to the children in ventilation which they carried to their parents at home. At the same time we were driving home the idea that this group of normal and sub-normal children could be taught better in fresh cool air than in warm vitiated air and that by simply throwing open the school-room windows we could secure ideal conditions.

The purpose of this article being to illustrate a comparison between open window school-room work and similar work performed in warm air school-rooms the information regarding the personnel of the parallel grades is set forth in the same detail, there being no selection of pupils except that

those in the open window room were placed there at the request of their parents.

OPEN WINDOW CLASS.						WARM ROOM CLASS.					
	Age.		Wt.	High.	Chest.		Age.		Wt.	High.	Chest.
1 Charles A. ..	13 yrs.	1 mo.	82 lbs.	57 in.	27 in.	1 George B.. .	12 yrs.	0 mo.	88½ lbs.	61 in.	26 in.
2 Edwin B. ...	13	2	73	58	24½	2 Bernard H.. .	12	0	88½	60	26½
3 James G.....	9	9	71½	54½	24¼	3 Joseph A....	12	8	80½	56½	25½
4 John K.	12	0	71½	56	25½	4 Joseph O....	12	1	79½	55	26½
5 Howard A....	10	6	65½	53¼	27	5 Edward J. ..	12	1	70½	55	24½
6 Milford B....	9	10	67½	54	24½	6 George A...	9	8	69½	53½	24½
7 Otto C.....	9	11	68¼	54½	24½	7 Harry W....	10	0	69	52½	25½
8 Maurice C...	9	3	69	55½	24¼	8 William G.. .	9	0	68½	53½	24½
9 Raymond C..	9	9	62	49½	25¼	9 James F.....	10	0	68	53	24½
10 Earl S.....	9	6	59	51½	23¼	10 Thomas B...	11	6	67½	55	27½
11 Raymond H.	9	8	59	51½	23 5/8	11 Edward A...	10	1	67½	52½	24½
12 George G. ...	8	8	58	52	23½	12 Joseph McF.	12	9	67½	53½	24½
13 John Z.....	9	8	57½	49½	26½	13 Frances E...	10	2	66½	54	27
14 William D....	9	7	57½	51	24 1/8	14 William O...	10	4	64½	51½	23½
15 Thomas O'D.	9	2	57½	51¼	24¼	15 Alex B.....	8	11	62½	53	24½
16 David A.....	10	2	56½	52	23⅜	16 Amerego S...	10	5	61½	50½	23½
17 Bruce McF...	8	2	55½	51½	22⅝	17 Lewis R....	9	10	61½	50½	24½
18 John B.....	8	4	58½	50½	23½	18 Warren McC.	10	8	61½	53	24½
19 William S....	8	4	56½	56	23 5/8	19 Gilbert M...	8	8	61	52½	23½
20 Charles V. ..	10	0	60	50½	24½	20 Edward N. .	11	3	60½	52	23½
21 John Bd.	8	11	54	48	23½	21 William R...	8	2	60½	51½	23½
22 Frank B.	8	4	54½	49	22½	22 George D....	10	0	60	51	22½
23 Herbert R....	9	10	55	53½	25½	23 Lewis D.....	9	0	59	50	23½
24 James L.	8	8	49	48½	21 1/16	24 Thomas M. .	9	0	59	53	25½
25 William M...	8	8	48½	51	23½	25 Raymond B..	9	3	56½	49½	23½
26 May L.....	11	0	75	60	21½	26 Hy. T.....	10	8	56½	50	24½
27 Ray W.	12	0	68½	58	24½	27 William A...	9	11	55½	50½	22½
28 Mary K.....	10	8	67½	54½	27½	28 Joseph G....	9	1	52½	50	25½
29 Agnes S.	9	8	65½	54	23½	29 Emil A.....	8	5	53	48½	23½
30 Cath. McC...	11	0	63½	55½	23½	30 William G...	9	6	47	48	21½
31 Rebecca B...	8	2	62½	52	25½	31 Harry F. ...	12	2	61½	52½	23½
32 Evelyn S....	11	0	62½	51	25½	32 Ruth R.	13	1	105½	54	32
33 Ada M.	11	0	61½	53	25½	33 Olga U.....	12	0	99½	60½	28½
34 Mary A.....	9	10	60½	49½	23½	34 Ruth K.	11	9	75½	56	25½
35 Florence E...	10	0	63½	54	27½	35 Mildred D...	8	10	69½	55	23½
36 Eva G.....	9	0	56½	50½	23½	36 Marian A...	12	5	69	55½	26
37 Alberta H....	9	3	58½	50½	23½	37 Jennie U....	10	10	67	53	26
38 Agnes M.	10	4	58½	51½	24½	38 Mildred M..	8	8	61	51½	23½
39 Bessie N.	9	3	52½	52½	24½	39 Carrie C....	8	10	59	51	23½
40 Marie M. L. .	10	5	41½	45	21½	40 Lillian P....	9	1	58½	49	22½
41 Dorothy M...	9	3	46½	49½	22 1/16	41 Katie T.....	9	9	57½	51	23½
42 Rachael G...	10	6	59½	54½	24½	42 Marg. McC..	10	9	49½	48½	22½
43 Gladys A.	8	8	49½	47½	21½	43 Ethel K....	9	0	49½	48½	23½
44 Sadie T.....	11	10	69	54	27	44 May N.....	10	7	67	53½	23½
Total 2669						Total 2893 lbs.					
Avg. wt. 60 7/17						Avg. wt. 65 7/11					
25 Boys 1526 = Avg. 61 1/25 lbs.						31 Boys 2004 lbs. = Avg. 64 5/11 lbs.					
19 Girls 1143 = Avg. 60 3/19 lbs.						13 Girls 889 lbs. = Avg. 68 5/13 lbs.					

In order to more plainly illustrate the physical condition of the two classes of children the following charts are submitted. The vertical lines represent the years of age, the horizontal lines pounds of weight and the curved lines the normal average weights of children for different ages.

The physically sub-normal or under-weight-for-age of each class are shown by the irregular lines joining the numbered black dots below the curves in each chart. The numbers alongside the dots correspond to the number opposite the children's names in each class list of pupils.

It will be noted (chart A) that there were eighteen markedly underweight children in the open air class, three of them between eight and nine years, the normal age for this grade, three between nine and ten years (one year retarded), five between ten and eleven (two years retarded), three between eleven and twelve years (three years retarded) and four from twelve to thirteen years, four years retarded.

In the other class (warm room) (chart B) there are nineteen physically sub-normal pupils, six between nine and ten years of age (one year retarded), seven between ten and eleven years of age (two years retarded), two between eleven and twelve years of age (three years retarded) and four between twelve and thirteen years of age (five years retarded). These retarded children, waterlogged at third grade when they should have reached the sixth or seventh, had already lost many years of opportunity, and the cost to the board of education was many, many dollars more than necessary.

CHART A.

Open Window Class

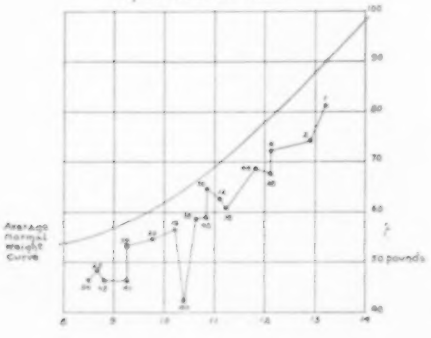
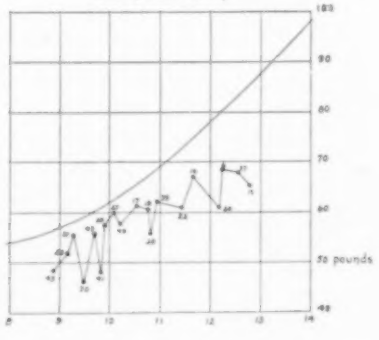


CHART B.

Warm Air Room



Conclusions.

The beneficial effect of the open windows, on the health and scholastic progress of the children can be attributed to the following:

Volumes of pure, fresh, cool air roll into the room with none of the vital qualities impaired by artificial handling; Nature's proper proportion of moisture is mixed with this atmosphere, varying from hour to hour and day to day. The bracing effect of cold is stimulating to health and renders the children more resistant to infecting bacteria and disease. It

prompts frequent class drills and exercises, which prevent air stagnation in the room and enables every pupil to change his breathing zone. The lungs are thoroughly ventilated as well as the room. Expired air at body temperature and exhaled gases at over 90° Fahr, set free in the cold air room, rise rapidly to the ceiling and pass out the upper window openings, being replaced by the pure air coming in the lower window openings. The physical exercises are designed to maintain chest elasticity, affording opportunity for normal lung expansion and thus the children acquire proper breathing habit. This means better aëration of the blood with resulting mental stimulation. Certain it is that these fresh air pupils are live wires.

The class seated. These photographs are intended primarily to show the open windows and are purposely taken against the natural light, without flash powder.

Almost anyone on reflection will be impressed with the futility of expecting a maximum progression physical and mental, when children are housed in overheated rooms, with little or no moisture, compelled to sit in uncomfortable positions and perform tasks prodigious and complicated to feeble and inactive minds resulting from undernourished and devitalized bodies. Such children, passing on dismissal into the cool moist atmosphere outside the building have the respiratory mucous membrane suddenly chilled and "catch cold." Not so with our pupils of the open windows, breathing a

mixture of air and moisture at a temperature more nearly that of the outside atmosphere. They do not encounter such a sudden change at recess or on the homeward journey and do not "catch cold." They keep well and are regular in attendance. It can safely be said that the chief cause of "colds" in school children is not exposure to cold as such, but exposure to the overheated and confined air of school-rooms and living rooms. It can also be safely assumed that the best available air for school-room purposes is the cool outside air with its proper mixture of moisture, which Mother Nature so bountifully provides for all willing to receive.

Pupils moving their desks to side walls of room to clear floor space for physical exercises. Time necessary, one minute. After exercise it takes one minute to replace them and resume class work.

As to the Weights.

The total weight of the 44 pupils in the open window room September 30, 1912, was 2,669 pounds—an average of $60\frac{29}{44}$. The 25 boys weighed 1,526 pounds—an average of $61\frac{1}{25}$; the 19 girls weighed 1,143 pounds—an average of $60\frac{3}{19}$ pounds.

Twelve Weeks' Gain.

On the last school day in December (at the end of 12 weeks) the average weight of the boys was $63\frac{5}{24}$—an average gain of two pounds; the

average weight of the girls was 62 7/13 pounds—an average gain of two pounds.

The Physically Sub-normal Ones.

The *under weight* of the 18 physically sub-normal pupils in this class, calculated on the average normal weight for their respective height and ages, was 146½ pounds or an average of 8½ pounds. Seven of these were boys, total weight September 30, 435 pounds—average 62⅛ pounds; December 20 their total weight was 449 pounds—average 64⅛ pounds—gain two

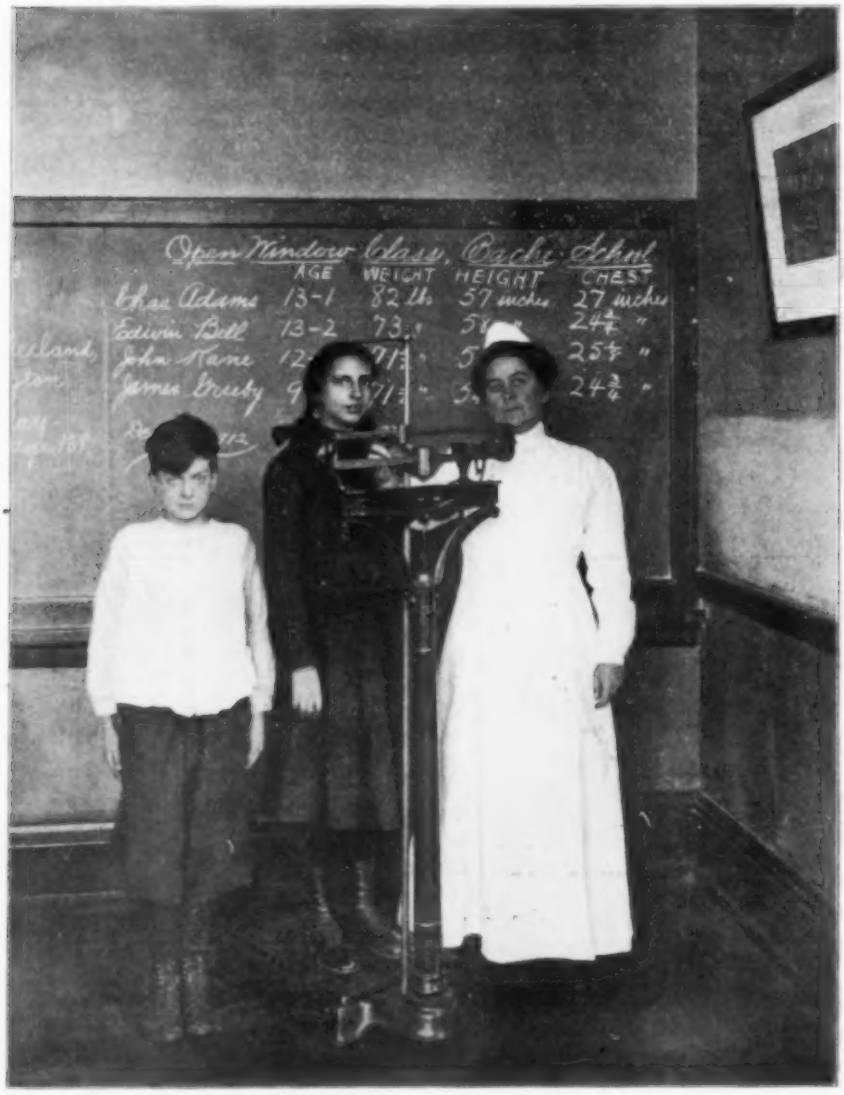
Class at Exercise—Chest lift. Arms up and back to Y stretch position.

pounds average. Two of the girls at the end of ten weeks, one after gaining two pounds and the other three pounds, were transferred to other schools; at the end of twelve weeks (December 20) the actual gain of the nine sub-normal girls remaining in the class was 24¾ pounds—an average gain of 2⅔ pounds. And so the gain has been uniform, boys and girls alike; normal and sub-normal alike, and a fraction over two pounds average, each.

In the Warm Air Room.

The example set by the open windows, and the benefits observed by other teachers in this building led most of them to keep an eye on their classroom thermometers with the result that windows were freely and frequently

thrown open in many rooms several times a day, and more often than heretofore. Particularly was this true in the room of the parallel grade with


Open Window Class, Bache School
AGE
WEIGHT
HEIGHT
CHEST
Chas Adams 13-1 82 lbs 57 inches 27 inches
Edwin Bell 13-2 73 24½ "
John Kane 12 71 5 25½ "
James Crosby 9 71 5 24¾ "

School Nurse Weighing and Measuring Pupils.

which a comparison of results was intended to be made. This teacher was naturally anxious that her pupils should compare favorably in every way with those taught in the open window room, and the medical supervisor

could not consistently ask her to keep her windows closed and deny to her pupils the fresh air to which he knew they were entitled. So in the early fall they also gained in weight and it was not until cold weather set in late in November that they were in very warm air. Their weight averaged $65\frac{10}{14}$ September 30 and $66\frac{3}{4}$ December 20—just about one pound average gain as compared to the two pounds average gain in the open window room children.

The class work of the fresh air children has shown improvement in the same marked degree. They enjoy study in the cool air and learn rapidly. Results show it.

Appendix.

Alexander Dallas Bache School,
Philadelphia, January 23, 1913.

Dr. Walter W. Roach,
District Medical Supervisor.

Dear Sir:—You ask my opinion as to what effect the open windows had upon the mental activity of these children. Three months ago when we began our experiment it was with the assumption that, as the speed and joy of a walk increase as the temperature falls from 70 degrees to 50, an analogous change would take place in the mental activity of pupils as we lower the temperature of school-rooms by letting in the pure, cold, outside air. While the time has been short and the weather unfavorable for exhaustive study, I am of the opinion that, as the temperature falls to 50 degrees, day-dreaming on the part of particular pupils decreases and the alertness of the whole class increases. This means better attention and more effective work.

To prove that these conclusions are founded upon fact is a difficult task. Every schoolman knows how hard it is to measure the progress of a class of children without involving the question of the merit of teaching. As far as possible I have tried to do this by three simple exercises given to an open window class and a closed window class of the same grade. These exercises consisted of committing to memory and writing four lines of poetry, of solving four problems in the primary operations of arithmetic and of studying and writing fifteen difficult words. The teachers took as little part as possible in this work. The exercises were given on different days with the following results:

Closed Window Room	Open Window Room	
		Poem:
39	32	No. of pupils in class.
33	33	No. of words and punctuation marks and capitals in selection.
1287	1056	Total number of words and marks for all pupils.
1108	967	No. of words and punctuation marks correct for all pupils.
86	91.5	Percentage correct.
70	46	Temperature of rooms.
		Arithmetic:
38	32	No. of pupils in class.
4	4	No. of problems.
152	128	Total number of problems for all pupils.
92	93	No. of problems correct for all pupils.

60.5	72.7	Percentage correct.
64	48	Temperature of rooms.
		Spelling:
39	29	No. of pupils in class.
15	15	No. of words.
585	435	Total number of words for class.
342	251	Total number of words correct.
58.4	57.7	Percentage correct.
70	48	Temperature of rooms.

Fifteen minutes were allowed for arithmetic and twelve minutes for each of the other exercises. While the results can hardly be called a proof of our claims, we believe with our other observations that they are straws that show the direction in which the wind is blowing and so shall continue our study of the subject.

Yours very truly,

WALTER C. BISHOP,
Principal.

EFFICIENCY

M. T. Stevens.

Chief Sanitary Engineer, Department of Health and Sanitation, Seattle, Wash.

In every business the keynote of success is efficiency in every branch or department, whether the business be large or small, a notion store or a ship building plant; and especially should efficiency be demanded in connection with municipal government in all its branches.

How many times have citizens, and others, been heard to remark that a government or municipal job is considered a snap. But why is it so? Is it because the general public, upon going into a public office, notices a number of employes moving about with all the appearance of lack of work, or lack of interest in their work, or is it because the public does not understand the amount of work connected with any public office? There is certainly some reason for this adverse attitude on the part of the public.

Let us review the case of the municipal department which seems to be the center of attraction all over the civilized world today, and that is the Health Department. There is not a department in which it is more difficult to show a return for money expended than the Health Department. It shows no financial income, or any other return for the money expended, which can be counted as a gain in wealth, unless one will take the time to peruse a lot of dry statistics and comparisons, and then it is a question whether the dear taxpayer is entirely satisfied with the results the figures show him.

It is a difficult thing to convince the people that a low death rate is brought about by the activity of the Health Department. It is also very difficult to make people realize that in saving and protecting human life many dollars are saved to the country or to the State. When we request people to do things that we think will protect the health of our citizens they say, "Those conditions have existed for the past fifty years and I am as healthy as any one." I know of a case where a certain well had been used for drinking water for a great many years and the people who used it were apparently, always strong and healthy, yet a case of typhoid fever was reported in a family that had been using the water for only a few months. Upon analysis the water was found to be very badly contaminated and the well was condemned, whereupon the owner came to my office with a big cry about the purity of the water, and how they enjoyed that water so much better than any water they had ever drunk. It was clear and cold and the top around the well was cemented very tightly so that no filth could possibly enter. He loudly proclaimed that these new-fangled

ideas about health were all bosh, cost too much money, and declared that the Health Department was created only to supply a few with fat jobs in order to pay off some political score.

Now let us get down to where cost and efficiency play the heavy part in this department. We know how much the department is costing the city, but do you, Mr. Head of the Department, know whether you are running the department so that the men under you are giving the city work equivalent to the amount they receive each month? You know of course, by looking up your statistics, that through your term of office, you have reduced the death rate to a certain degree; at least that is what the figures show, and you may be perfectly satisfied that your work shows for itself; but, do you know just how much your men are able to accomplish? Have you any method by which you can say that your men are giving the work all that is in them? In nine cases out of ten you have no idea as to the amount of efficiency your men are showing.

A city, at a considerable expense, secures the services of an efficiency expert who, after a great deal of work in inspecting the books, makes a report saying that the department shows great results and is therefore highly efficient, and is a paying investment, but he does not show how we may get greater efficiency to a degree of the utmost. That seems to be a point sadly overlooked, and it is left to the department head to work out a method by which he can tell to almost an absolute certainty, the degree of efficiency. That is what happened to the Seattle Health Department, and I believe our method is a very good one. I would like to hear of it being tried elsewhere, or would like to hear of a better one, or one in comparison.

In our division of inspection I realized that it was a most difficult thing to keep track of the men while in the field at work, even though I followed them up and noted their ways of accomplishing results. In most cases everything showed up well, but after considerable study I found that it was next to impossible to judge, from what I saw, and from their daily reports, as to the exact amount of work each man was doing. It therefore became necessary to devise some scheme, or method, whereby we could compare the work of the different men. The result is that we have worked out a system upon a percentage basis and the results so far are very satisfactory.

In explanation of our reporting system I will say that our organization is such that the city is divided into three sanitary districts, over each of which there is a district chief, or assistant to the chief sanitary engineer. These districts are sub-divided, with a man in each sub-division who reports directly to the district chief every day by written report. These reports show what work has been done every day, and from these daily reports the district chief assembles the statistics and makes a written report to

the chief sanitary engineer every ten days. At the end of each ten day period a summary of the inspections, complaints, and abatements of nuisances, and each man's daily percentage of the whole, is worked out and platted to a curve, so that we are able at a glance to see just how one man compares with another and what proportion of the work each man does. Everything considered, the method works out very well and enables us to judge whether every man is doing his share, also which are the most efficient. Those who are low are given special attention and instruction; if they still continue to be low, for no reason over which they have control, the weeding out process begins.

Some men are able to handle a great amount of work of a smaller kind, while others are able to handle a large kind of work. In the older part of our business district, which is only a short distance from the water

DEPARTMENT OF HEALTH AND SANITATION
CITY OF SEATTLE
DIVISION OF INSPECTION
EFFICIENCY REPORT OF INSPECTORS

DISTRICT C — 2ND FOUR MONTHS 1912

INSPECTOR	No OF DAYS	TOTAL			DAILY AVERAGE			% OF TOTAL			DAILY %		
		INSP	COM	ABTS	INSP	COM	ABTS	INSP	COM	ABTS	INSP	COM	ABTS
A	90½	1716	468	502	18.9	5.59	5.54	.25	.24	.298	.28	.27	.33
B	72	1413	439	349	19.5	6.09	4.86	.206	.216	.208	.29	.30	.29
C	92	2098	677	416	22.8	7.35	4.52	.306	.333	.246	.33	.36	.27
D	92	1634	429	418	17.7	4.66	4.54	.238	.211	.248	.26	.23	.27

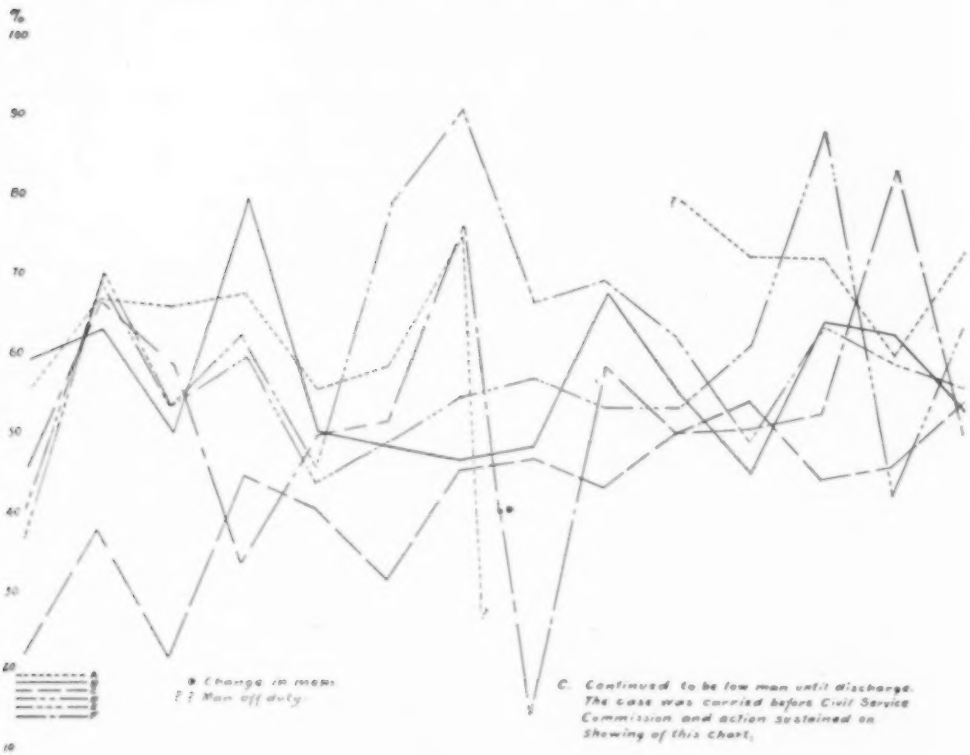
Asst Chief

front, the buildings were constructed at a time when no particular attention was paid to sanitation, and no thought given to the possibility of this city ever becoming exposed to, or infected with Bubonic Plague through the medium of the rat. We therefore have found a great many buildings with cellars having wooden floors, which give the rats an ideal place to harbor and breed.

When it becomes necessary to rat proof a building, one of the first things to do is to tear out the old wooden floors in the cellars and replace them with concrete, thus robbing Mr. Rat of his nice, warm home. This is where the real fine work of the inspector comes in, as in more cases than not, the owner of the building objects to spending any more money on an old building and will stop and argue the matter upon the first approach of the inspector. This is where the result of our efficiency reports shows up. We find that there are some of our men whose percentage is more than average high, therefore we place those men in the district or subdivision in which the so called difficult work is to be done, and we are able to select, before long, the men who are able to get results in the way

of abatements, as we term work being done upon order from the Health Department.

We also find that some of the men who hold high percentages in the small work are unable to do nearly as well in the large work. In this way we are able to separate and catalogue each man and place him where



This chart shows by curves, the percentage efficiency of the men in one branch of the Sanitation Department of the City of Seattle. Different colors of ink are used for the different curves on original charts.

This chart is not platted from accompanying report, as the charts are not made unless requested by the Commissioner of Health so that he may see at a glance the comparison between men.

This form represents work done for a period of four months, but can be used in the same way for any length of time. We make them out in our department every month for the three ten-day periods mentioned in the text of this article.

Some of the men thought it was possible to juggle the work in such a way as to beat the system, but were caught at it and we have had no more trouble.

he is the most efficient. Through this careful attention in detail to each man's work, the department of this city is returning to the taxpayer a dollar for every dollar expended in maintaining the Health Department.

I consider that the efficiency of the Health Department of any city is an item which should be given the most careful attention possible. You may say that this is all unnecessary, that your results show the efficiency, which may be true enough, but upon analysis you may find that you might get greater results.

Accompanying are forms, filled out, showing the method in operation in the Health Department of the City of Seattle.

A MEDIUM FOR ISOLATION OF THE COLON GROUP.

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Read before the Laboratory Section, American Public Health Association, Washington, D. C., September, 1912.

The use of bile, or bile salts in media for the isolation of the colon group of organisms, has now been practised for about twelve years, and its place in the fixed laboratory procedure has been generally established and acknowledged by all workers along these lines.

The use of bile salt (sodium taurocholate) was first proposed by McConkey in 1900. This was followed by Jackson, who in 1906 advocated the use of fresh sterile ox bile to which peptone and lactose had been added. Since that time many modifications of these two substances have been proposed, but all are built upon the use of either the bile or bile salt as the basis. Recently the dried ox bile has been placed upon the market, and so far as the writer is aware, has given satisfactory results. The writer has used both the fresh and dried product in the work in his laboratory, and finding no appreciable difference in their action toward the colon group, has discontinued the use of the fresh bile. The dried product is more easily obtained, is more convenient to use, and has been found no more expensive, taking all points into consideration.

Some experimental work was undertaken this past year to find a more satisfactory medium than litmus lactose agar for the isolation of the colon group from water. The work was interrupted at times, so the studies have not been carried as far as intended, but it is expected that additional work will be done along the lines suggested in this brief report.

As is well known, not all red colonies on litmus lactose agar prove to be of the colon type, and a medium giving a larger number of positive tests is desirable. A medium of the following composition was devised and tested for adaptability to this line of work:

Dried ox bile	10%
Peptone (Witte)	1%
Agar (Shredded)	1.5%
Lactose	1%
Neutral red (1% sol.)	1%
Distilled water	q. s.

The dried bile and peptone are added to the distilled water, boiled and filtered through paper. The agar is then added and heated for one

hour in the Arnold steamer. While the agar is dissolving it is well to prepare a filter of cheese cloth and absorbent cotton as proposed by Major Russell of the U. S. Army, and place this in the sterilizer with the bile solution. When the agar is dissolved it is filtered through the cotton, and the lactose, which had been dissolved previously in a small quantity of hot distilled water, is added, also the neutral red solution. After thorough mixing the material is tubed, placing from 6 to 10 cc. in each tube, depending upon the size of Petri dish used, and autoclaved for ten minutes at 12 pounds pressure.

When in tubes, this medium looks quite red, but when placed in Petri plates in a thin layer, it is yellowish brown in color, and more or less opaque. On this medium colon-like colonies produce a distinct purplish red zone, which is characteristic. There is a clear area immediately surrounding the colony, which shades off into the denser medium.

Owing to the inhibitory action of the bile, many bacteria which grow on litmus lactose agar will not grow on this medium.

Plates of bile agar and litmus lactose agar were made from a suspension of horse feces using sterile distilled water as the diluting medium. At the end of twenty-four hours' incubation, 65 colonies, all showing characteristic appearance, were found on the bile agar plates, while 200 colonies, only 40 of which were red, were counted on litmus lactose agar plates. Sub-cultures of various colonies from the bile agar plates showed them to be of the colon group.

A series of 17 cultures isolated at various times from water and one colon culture were inoculated into plates of bile agar and litmus lactose agar. Only 8 of the 18 grew on bile agar, and only two of these gave typical colonies on the plates. One of these was the colon which has been isolated from feces and the other was a member of the group isolated from a municipal water supply. Nine cultures, only two of which were of the colon group, gave a red growth on litmus lactose agar plates.

Samples were collected from two city supplies, and two spring supplies. One city supply was excellent, while one frequently showed colon in 1 cc. quantities. One spring was located in the country far removed from contamination, while the other was situated in a small village and subject to contamination.

Samples from the good city supply showed no growth at 37° C on bile agar, and only occasionally on litmus lactose agar, and then no red colonies. From the other city supply only 33 per cent. of the colonies developing on litmus lactose plates were red, while on bile agar plates over 69 per cent. of colonies developed were red.

No growth on either litmus lactose or bile agar plates was obtained from the safe spring.

Of the samples from the other spring 20 per cent. of colonies on litmus

lactose were red, while 100 per cent. of those obtained on bile agar were characteristic of colon.

Twenty-nine cultures, not all of which were characteristic of colon, were taken from the bile agar plates and sub-cultured into milk, neutral red lactose, Dunham's solution, nitrate broth, and gelatine. When gas was produced in the lactose, milk coagulated, indol and nitrites produced, and gelatine not liquefied in ten days, the test for colon was considered positive. Of these 29 cultures, sixteen, or 55 per cent. were of the colon group. At the same time 38 cultures were taken from the litmus lactose agar plates and tested in a similar manner. Only 7, or 18.4 per cent., were colon.

Of these 67 cultures, 9 were cocci, 3 of the 9 being streptococci. These 3 gave a red growth on bile agar, but the characteristics which distinguished the colon group on this medium were absent. The colonies were much smaller than colon, and the color reaction not so pronounced.

The writer is aware that this use of bile or bile salts as a direct plating medium is criticised on account of its inhibitory action on weak and attenuated colon; but it seems that the number and vitality of these organisms in a water should be considered, rather than their mere presence. If strains of this organism are present in such a weakened and changed condition that they will not grow on bile media fortified by lactose and peptone, their sanitary significance is diminished to a marked degree, since it is recognized that the colon is more hardy than the typhoid and other pathogenic organisms occasionally found in water. If the colon is so weakened as to need rejuvenation before being demonstrable there is little danger from typhoid and other pathogens.

Conclusions.

Not all red colonies on litmus lactose agar are colon.

A medium of the composition suggested inhibits many forms seen on litmus lactose agar, and gives a larger percentage of colon organisms.

In the work so far reported on, 55% of the colonies from bile agar were positive for colon as against 18.4% of those on litmus lactose agar.

A PLAN FOR THE REORGANIZATION OF THE PUBLIC HEALTH SERVICE IN THE STATE OF NEW YORK.*

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Those who have come into intimate contact with public health administration in the state of New York have long realized that, apart from a few large cities, the method of organization and the results achieved were not at all what they should be and that the State Department of Health was powerless to carry out much needed reforms. Some of these defects were realized by the local health officers themselves and during the previous session of the legislature the legislative committee of the State Sanitary Officers' Association secured the passage of a bill whereby it was hoped to strengthen the power of the local health officers. The bill, however, failed of enactment because of the governor's veto.

The science of public hygiene has developed enormously in recent years, even more, perhaps, than any other branch of medicine, and it is illogical to expect, as we now do, that the local practising physician, busy with all the details and worries of a general country practice, shall keep in touch with the achievements of modern public health work. In addition to this, and here is the crux of the matter, his status as a practising physician in the community often places him at a decided disadvantage in the enforcement of proper public health measures. The result is that rural public health administration in this country is, to a large extent, inefficient. What is needed is a radical reform of our present method of organization; we should have trained officials sufficiently paid to obviate the necessity of their practicing and each administering with broad powers, a given district. This method of administration has been attended with pronounced success in Germany and England and there is no reason why it cannot be adapted to work equally well here. In fact, as will be seen from a study of the following pages, we can improve on the English plan by providing for a uniform set of rules throughout the state, in place of local ordinances.

At the present time public health administration in the State of New York is based on town and village organization. By the public health law, these municipalities are directed to organize boards of health. The

*This plan was presented by invitation before the Special Health Commission appointed by the Governor of the State of New York to inquire into the health conditions and administration of the State and to make recommendations looking toward improvement and greater efficiency.

law further directs these local boards of health to "make and publish from time to time all such orders and regulations as they may deem necessary and proper for the preservation of life and health, and the execution and enforcement of the public health law of the municipality" . . . further "Every such local board shall prescribe sanitary regulations for the burial and removal of corpses, and shall designate the persons who shall grant permits for such burial, and permits for the transportation of any corpse . . . etc." further . . . "Every such local board of health shall guard against the introduction of contagious and infectious diseases by the exercise of proper and vigilant medical inspection and control of all persons and things arriving in the municipality from infected places, or which from any cause are liable to communicate contagion." Further "Whenever such local board shall determine that any accumulation of water wherein mosquito larvae breed, constitutes a nuisance," . . . etc. "the owners of the premises shall bear the expense of its suppression, or so much of it as the local board may have determined to be equitable as hereinafter provided" . . . "If in any case the owner of the premises shall not, within a reasonable length of time, proceed to suppress or remove such breeding place, the local board may proceed to suppress and remove the same, and . . ."

The State Health Department has also prepared "Sanitary Regulations" which are "Recommended for adoption by local boards of health." Attached to these is a note, reading:—"Every local board of health should adopt such sanitary regulations as are necessary to carry out the provisions of the Public Health Law, and may adopt any ordinance required by local conditions to protect the public health. A fixed penalty should be stated in every case."

It is to be observed that although the Public Health Law places the main part of public health administration, including the making of regulations, in the hands of the local authorities, it contains definite *state* laws on certain subjects. Thus it forbids manufactures in eating and sleeping rooms in tenements. "No room or apartment in a tenement house, used for eating or sleeping purposes, shall be used for the manufacture, wholly or in part, of coats, vests, trousers, knee-pants, overalls, cloaks, shirts, purses, feathers, artificial flowers, or cigars, except by the members of the family living therein. . . . etc." The enforcement of this law is in the hands of the local board, or an inspector appointed by such board.

There is also a *state* law for the control of foods and adulterations. The enforcement of this is kept in the state health department, which turns the violations over to the district attorney of the county in which the violation occurred, who is directed to commence proceedings for the indictment and trial of the accused.

Bovine tuberculosis and glanders, which were formerly looked after by the state health department, are now supervised by the *State* Department of Agriculture.

The state health department has also adopted certain laws for the protection of water supplies. But the enforcement of these is left to the local boards of health, who, after securing certain proofs from the State Commissioner of Health must bring an action in a court in the county in which the nuisance exists. The action is for penalty and for an injunction.

There is a *state* vaccination law, the enforcement of which is really in the hands of the school authorities.

There is a *state* law for the examination and quarantine of children admitted to institutions for orphans, destitute or vagrant children. This provides also for reports by institutions to the local boards of health.

There is a *state* law regarding the sale of opium, morphine, cocaine and chloral. It does not state who is to enforce this law.

The Penal Code (*state* law) contains paragraphs concerning public nuisances, violations of quarantine regulations, food adulterations, false labels, skimmed milk, etc.

There is a *state* law regarding the employment of women and children in factories. Enforcement rests with the local health authorities.

Granted, then, that greater centralization of public health administration is desirable, how shall we proceed? And assuming for the present that a uniform state health law has been enacted, to whom shall be left the enforcement of its provisions? The simplest plan which suggests itself is perhaps one of districting the state and giving each district in charge of a District Health Officer, appointed by a State Health Commissioner, and subject to the latter's proper orders. The districts could be formed on the basis of population, and might consist of groups of towns, or individual counties, or groups of counties, being arranged with an eye to ease of administration, geographical situation, community of interests, etc. The good points of such a plan are apparent, centralized administration is assured and the financial problem is simplified since the District Health Officers would be paid out of the state treasury. On the other hand, it leaves unsolved an important question, namely, who shall make the state public health laws. Shall this be left to the state legislature, or shall it also be centralized and lodged with the State Health Commissioner, or with a small State Board of Health consisting of appointed officers? Moreover, it leaves the local communities without any direct voice in their health administration, thus going to the other extreme of present conditions. It seems to me that an effective middle road can be chosen, and that ample centralization of authority can be obtained even with a certain degree of local participation. The plan I have developed is as follows:

The unit of public health administration should be the county, and the execution of state public health laws should rest with the "County Health Officer." (See below.) To begin, a set of rules and regulations should be drawn up, and enacted as the public health laws of the entire state. These should prescribe minimum requirements and provision should be made to permit the enactment of additional requirements for local needs.

All the present village and town boards of health should be abolished. There is no reason why the laity should be formed into boards of this kind; the problems that arise are mainly public health problems, about which they can have no real knowledge and in which their judgment, at the present time, is, therefore, often incorrect. Moreover, in many of the towns and villages, this will at once effect a considerable saving, for some of the boards hold monthly meetings and the members attending are paid as high as two dollars for each meeting. With ten members this amounts to $240 annually. In other towns in the state conditions are quite the reverse, and there are, I am told, local boards which hold but one session a year and sometimes not even so often.

Practically all the powers and duties of the present local boards of health should be transferred to the new official, the County Health Officer, whose qualifications, mode of appointment, powers and duties will be described below.

The present local village and town health officers would be retained and while their title and duties would be somewhat similar to those they now have, they would be responsible to the County Health Officer and would carry out his orders. In addition to their present duties, the local health officers would be charged with the medical examination of all the children attending school in their respective districts. Every child should be physically examined once each year and a continuous record should be kept of such examinations. Just how best to compensate the local health officers is a very difficult matter to solve. It seems illogical to pay them directly in proportion to the number of cases of contagious and communicable diseases occurring in their district, for this seems like placing a premium on disease. But it is equally unfair to pay them a flat salary and expect them to handle a very large number of cases at a very low rate. At the present time the compensation is almost entirely on the fee basis, the local health officer charging the ordinary rates paid for private calls. Many of the local health officers are allowed five dollars for each disinfection. It would seem advisable to combine a minimum salary with fees for all visits, both medical and sanitary. The present law, requiring the payment, by the town or village, of the health officer's proper expenses for attendance at the annual conference of health officers is excellent and should be retained in any plan adopted. The local health officer would, as now, be appointed by the village or town board and his term of office would be four years.

Since the main object of the plan is to strengthen the hands of the public health officials, it is important to consider carefully the best way of appointing or electing the County Health Officer. The advocates of centralization would have him a state instead of a county official and so would lodge this power with the State Commissioner of Health, a plan which would undoubtedly make for independence on the part of the County Health Officer. On the other hand, there are many who insist that this is a violation of the principle of home rule; they would give the appointing power to the boards of supervisors. I feel that the latter plan is entirely feasible providing that County Health Officers must have certain qualifications attested to by the State Board of Regents. By then making them directly responsible to the State Commissioner, the chief public health executive of the state, sufficient centralization of authority would easily be effected.

Right here I should like to say a word about the initiation of the plan. At the present time, there are some 1400 local health officers, many of them conscientious public health workers and some of them undoubtedly men of considerable talent in public health administration. Since there are, at the present time, practically no candidates available having a Diploma in Public Health, it would seem proper to provide, that, immediately after the passage of this act, the State Board of Regents should arrange for and hold an examination for the Diploma in Public Health. This examination should be open to all the 1400 present local health officers, to former health officers and to others having experience in public health work. Record and experience should be given due weight in marking the candidates. The aim should be to provide by this examination only just about enough licensed health officers as would be sufficient to fill the various positions. Since the term of office of the County Health Officer would be six years, arrangements might meantime be made with some of the recognized medical schools to give courses preparing the candidates to pass the future examinations for a Diploma in Public Health. In other words, in the beginning, I would artificially create a body of licensed health officers by granting a Diploma in Public Health to all who passed the examination; afterwards a definite course in a medical school would be required of candidates taking the examinations. This would not only solve a vexing problem but would also provide a body of practically trained public health officials familiar with local needs. Moreover, by filling the initial County Health Officerships from the ranks of the present local health officers, the coöperation of these 1400 officials would probably be assured, a matter of no little moment.

To return now to the qualifications and duties of the County Health Officer. This official should be a physician specially trained in public health work and holding a Diploma in Public Health from the State

Board of Regents, or from some school recognized by the regents as granting its equivalent. He should be appointed by the Board of Supervisors, hold office for six years and be removable by the State Commissioner on charges. He would be paid a fixed salary out of the county treasury, and be prohibited from privately practicing medicine. In all public health matters he would be subject to the proper orders of the State Commissioner of Health and he would be required to faithfully execute the public health laws and regulations in his county. He should be empowered, in times of threatened epidemic, to contract proper debts for the conduct of his work, provided this action has the approval of the State Health Council. Such debts should then constitute a proper charge against the county treasury. There should be some provision whereby the county Health Officer can constantly know just what is going on about him, and all returns of communicable diseases should therefore pass through his hands. Moreover, the diagnosis laboratories should regularly send to the County Health Officers a list of communicable diseases coming to its notice in their respective counties. Finally, the State Registrar of Vital Statistics should send monthly statistical analyses concerning conditions in the counties, to each County Health Officer, to the end that the latter may direct his work to the best advantage. This arrangement would permit the enactment of the model registration law devised by Dr. Cressy Wilbur, of the United States Census Bureau.

Among the duties of the County Health Officer should be that of providing facilities for the prompt performance, for physicians, of the ordinary diagnostic laboratory tests. Whether this would necessitate the appointment of an additional part-time or full-time physician would depend on circumstances. The maintenance of a sufficient force of assistants to properly carry on the work of the office should be controlled by the State Health Council, to be described.

The county health officer should also supervise the work of the medical school inspection but the actual examinations would, of course, be made by the local health officer.

Provision should be made to give the County Health Officer complete charge over certain hospital facilities for the purpose of properly isolating contagious diseases. Perhaps this can be worked out in connection with the tuberculosis hospitals which the counties are now empowered to establish. A part of the beds in these tuberculosis hospitals should be under the sole control of the County Health Officer, at least, in so far as forcible retention is concerned. Whether or not the County Health Officer should have complete charge of the county tuberculosis hospital, is debatable.

Whatever orders are to be issued should be issued by the County Health

Officer, or in his name, and he should be protected by the county in all suits for damages. Provision should be made for securing for him, at any time, expert legal advice as to any action he may desire to take. This would probably be best arranged by placing the services of the District Attorney at his disposal in case of need.

Cases of smallpox, and the like, should be cared for by the County Health Officer, or his assistants. This would be far preferable to the present practice of having such cases cared for by the local health officer, who at once loses all his private patients for the time being.

I feel strongly that somewhere in this reorganization of the public health service there should be lodged wide powers, so that the duly constituted health authorities may effectively cope with disease. We have already seen that it is inadvisable to lodge this power with the local authorities and there is moreover very great need of securing uniform effective health regulations throughout the state. Following the spirit of our republican institutions, I at first thought to give this power into the hands of a representative body composed of all the county health officers, all the city health officers, and the State Commissioner of Health. This body, however, proved to be so large that it would probably have been unwieldy; moreover, there was some question as to whether a body made up entirely of physicians should be given such broad legislative powers. It seems to be better, therefore, to restrict the legislative powers to a smaller body, "The State Health Council," composed of the following:

The State Commissioner of Health, presiding,

The State Commissioner of Labor,

The President of the State Board of Charities,

The Commissioner of Health, or the General Medical Officer, of the City of New York,

The Health Officer of the Port of New York,

Two County Health Officers, Two City Health Officers } elected by the Annual Conference of County Health Officers.

This "State Health Council" would hold monthly meetings and would be the supreme public health authority of the state.

It will be noticed that the "Council" is composed of both physicians and laymen and combines the heads of various state departments having in some way to do with the health conditions of the people. A word may be said concerning the State Labor Commissioner. In the State of New York, the Department of Labor deals with a wide range of functions relating to the supervision of conditions of labor. Among the functions relating to industrial hygiene have been included a number which really belong to the Department of Health. In the new state health law the province of the state labor department should be clearly defined, to the end that duplication of effort be avoided. It seems to me that a division

of function can easily be effected by giving to the health department all questions dealing with clearly preventable diseases, while reserving to the labor department the control of conditions interfering with efficiency, and the prevention of bodily injury and death. The health department would thus deal with the control of infectious and industrial diseases, dust removal, etc., while the labor department would take up fatigue, hours of labor, lighting and ventilation of workshops, safety devices, child labor, etc.

The supreme public health authority in the state would be this State Health Council. The Council should have "power to make rules and regulations embracing all matters to which and so far as the power and authority of the county health officers extend not limiting their application to the subject of health only."* But no such enactment should take effect until the same had been published in certain designated newspapers.

Subject to the rules and regulations of the State Health Council, the administration of the state health service should be vested in a State Commissioner of Health appointed by the governor by and with the advice and consent of the senate. He should be a physician, a graduate of an incorporated medical college, of at least ten years' experience in the actual practice of his profession and of skill and experience in public health duties and sanitary science. The term of the State Commissioner of Health should be six years and he should receive an annual salary of ten thousand dollars and his expenses actually and necessarily incurred in the performance of his official duties, to be paid monthly on the audit of the comptroller. He would be empowered to employ such clerical and other assistants as were necessary for the proper performance of the powers and duties of the department provided that the positions to which these were appointed had been previously created by the State Health Council, or by the provision of this act.

The State Commissioner of Health should take cognizance of the interests of health and life of the state and of all matters pertaining thereto. He should make inquiries in respect to the cause of disease, especially epidemics, and investigate the source of mortality and the effect of localities, employments and other conditions upon the public health. He should obtain, collect and disseminate such information relating to mortality, disease and health as may be useful in the discharge of his duties or may contribute to the promotion of health or the security of life in the state. He should cause to be prepared and shall submit to the Council any information which the Council may request as necessary for its guidance in its duties. As chief executive of the state health service, he shall faithfully carry out the directions of the State Health Council, and

* This valuable clause is adapted from the law under which the Board of Health of the City of New York exercises its various powers.

those of the Health Council. He should see that the State Health Regulations and all County Health Regulations are properly enforced and if need be, he would call on the governor who should thereupon use the powers at his disposal in order to enforce such regulations and laws. In case of need, and with the approval of the Health Council and of the governor he might contract debts in the proper performance of his duties, which debts should be a charge on the state treasury.

Among the duties devolving on the State Commissioner of Health should be the collection, tabulation, and publication of vital statistics. The provisions for carrying out this important work should be practically all of those of the model law devised in the U. S. Census Bureau.

No one who is familiar with the situation will question the propriety of entirely excluding the City of New York from any control by the State Council, while still giving the city a voice in the latter's deliberations. Even as an abstract proposition this exception is based on sound public health principles.

Since the results of improved rural public health administration benefit the large cities out of proportion to the rest of the state, it has generally been recognized as proper to reapportion the charge for rural health service so that in many instances only a small part of the expense is actually borne by the county in question, the rest being borne by the state at large. The principle of this method has been adopted in Great Britain. It seems to me that some means should be provided whereby even the very sparsely populated counties, or the counties with a very small assessed valuation should be able to maintain highly efficient public health administrations. In order to distribute the burden as equitably as possible and also in some measure in proportion to the distribution of the benefits derived, I have based a redistribution of the expense of county administration on the assessed valuation of the various counties. This can be seen from a study of the following table: Thus

Assessed valuation	Under	$10,000,000	the state	bears	9/10
$10,000,000	to	20,000,000	"	"	8/10
20,000,000	"	30,000,000	"	"	7/10
30,000,000	"	40,000,000	"	"	6/10
40,000,000	"	50,000,000	"	"	5/10
50,000,000	"	60,000,000	"	"	4/10
60,000,000	"	70,000,000	"	"	3/10
70,000,000	"	80,000,000	"	"	2/10
80,000,000	"	90,000,000	"	"	1/10
Over $90,000,000	valuation		"	"	nothing

The population of the State of New York is very close to ten millions and of these about seven millions live in incorporated cities. Approximately three million inhabitants would thus be under the supervision of

the state health authorities with its 1400 local health officers. Insisting on a physical examination of every school child once each year as one of the duties of the local health officer, it may be well to see how many school children there are in this population of three million. In the city of New York the total enrollment of children in the public schools is 675,000 and in the parochial schools 135,000, a total of 810,000 out of a population of five millions. For three million people this would mean 486,000 and dividing by 1400, the number of local health officers, we find that each health officer would supervise approximately 350 school children, the village health officer usually more, the town health officer less. Under the circumstances it might be feasible to pay the local officer say fifty cents for each child examined, the money to come out of the county treasury in order to effect an equitable distribution of the charge.

The local health officer should also be paid a per capita fee based on the population in his district. Inasmuch as the increased work demanded by village communities in proportion to their population is counterbalanced by the distance travelled in reaching all parts of a township, it seems to me that no distinction should be made in the per capita rate of the two communities. A sliding scale should however be provided and a minimum lump sum per annum specified, somewhat along the following lines:

In villages or townships with 500 to 1000 people, 20 cts. per capita.
1000 to 2000, 20 cts. first 1000, and 10 cts. for all over.
2000 to 3000, 15 cts. first 2000, and 5 cts. for all over.
3000 to 4000, 12 cts. first 3000, and 4 cts. for all over.
4000 to 5000, 10 cts. first 4000, and 2 cts. for all over.
5000 and over, 8 cts. per capita.

No local health officer should receive less than $100 annually exclusive of all other fees (school, lunacy, labor, etc.).

It is very difficult to estimate the increased cost of the health administration here outlined, for the reason that so little is known concerning the present cost of administration. We have already noted that the unit of health administration in this state is the city, town or village board of health. These boards are a law unto themselves and there is the greatest diversity in their make-up as well as in their compensation. In some communities the members of the board of health serve without pay and the health officer is either paid a salary or works on a fee basis; in other communities the members of the board of health receive a fee for each meeting attended, the fee varying from two to five dollars. Here too the health officer may receive a salary or work on a fee basis. The number of members of the health board is also subject to variation, though commonly the board numbers from six to ten members. The following table is of interest.

Expenditures of Certain Towns in Westchester County, N. Y., 1911.

Town	Total spent for health work	Of which, paid to members for attending board meetings
Greenburgh	$667.43	$236.00
Cortland	1373.00	408.00
Harrison	820.00	70.00
Mamaroneck	318.00	206.00
Ossining	840.00	96.00
Rye	400.00	58.00
Scarsdales	461.00	126.00
White Plains	547.00	304.00
	$5426.43	$1504.00

When we recall the functions of the present local boards of health, it will be seen that here we already have $1500 toward the maintenance of an efficient county health administration. It must at once be stated, however, that in some counties, not a single local board of health pays its members for attending meetings. Thus, in Washington County, with a population of 47,778, a total of $1877.00 was expended for public health work by the various local boards and none of this was spent on meetings.

So far as the expense to the local community or county is concerned, we must first determine the average number of people under the supervison of the local health officer. Dividing three millions by 1400, gives an average population of 2143. According to the scale of fees shown on a previous page, this would mean about $300 per annum for each local health officer. In addition to this, he would receive 50 cents for the examination for each school child, or $160 for the estimated 320 children in his community; and the county would pay him the usual fees for the examinations made in lunacy cases. Moreover, he would receive as now, the usual fees for visits paid to cases of contagious diseases and the state would pay him the small fees now paid for reporting vital statistics and contagious diseases. Altogether he might have an income, from the sources enumerated, of about $500 to $600 per annum; it would probably never be less than $150 even in the most sparsely settled communities. So far as can be judged from the meagre data available, the local communities would have to spend three or four times what they now do on public health work. While this may appear a large sum, it is only so because of the utterly inadequate expenditures heretofore made for this important work, expenditures entirely out of proportion to the population when measured by accepted standards. Thus, New York City spends annually over seventy cents per capita on its health work and this does not include the removal of garbage and ashes, or street cleaning, or sewage disposal.

The plan here outlined provides for a local expenditure of probably less than one-third that made in New York and carries with it the assurance of effective prevention of disease and the reduction of the death rate. That the money spent would represent a good investment is evident to anyone who examines into present conditions and realizes the economic importance of health work.

Appendix.

The following is a list of the incorporated cities in the State of New York. It will be noted that many of them have but several thousand inhabitants. The exception of these from the plan above outlined is due to certain difficulties which, I understand, would arise owing to the rights granted to these cities under their charters. Personally, I feel it would be preferable if the plan could be applied to all except the large cities, say all the towns, villages and cities, excepting cities of a population of 100,000 or over.

INCORPORATED CITIES, NEW YORK STATE.

City	*Population 1910*
Amsterdam	31,267
Auburn	34,668
Binghamton	48,443
Cohoes	24,709
Corning	13,730
Cortland	11,504
Dunkirk	17,221
Elmira	37,176
Fulton	10,480
Geneva	12,446
Glens Falls	15,243
Gloversville	20,642
Hornell	13,617
Hudson	11,417
Ithaca	14,802
Jamestown	31,297
Johnstown	10,447
Kingstown	25,908
Lackawanna	14,549
Little Falls	12,273
Lockport	17,970
Middletown	15,313
Mt. Vernon	30,919
Cities of over 100,000—1910	
New York City	4,766,883
Manhattan	2,331,542
Bronx	430,980
Brooklyn	1,634,351
Queens	284,041
Richmond	85,969
New Rochelle	28,867
Newburgh	27,805
Niagara Falls	30,445
North Tonowanda	11,955
Ogdensburg	15,993
Olean	14,743
Oneida	8,317
Oneonta	9,491
Oswego	23,368
Plattsburgh	11,138
Port Jervis	9,564
Poughkeepsie	27,936
Rensselaer	10,711
Rome	20,947
Schenectady	72,826
Tonawanda	8,290
Troy	76,813
Utica	74,419
Watertown	26,730
Watervliet	15,074
Yonkers	79,803
	1,081,076
Buffalo	423,715
Rochester	218,149
Syracuse	137,249
Albany	100,253
	5,646,249
Population, incorporated cities, 1910	6,727,325

THE COUNTIES OF NEW YORK STATE, SHOWING AREA, POPULATION, ASSESSED VALUATION, AND THE CITIES CONTAINED THEREIN.

County.	Area in Sq. M.	Population, 1910.	Assessed Valuation.	Cities.
Albany	499	173,666	$120,100,000	Albany, Cohoes, Watervliet
Alleghany ..	1,060	41,412	21,300,000	
Broome	685	78,809	42,000,000	Binghampton
Cattaraugua	1,356	65,919	32,500,000	Olean
Cayuga	773	67,106	42,400,000	Auburn
Chatauqua .	1,020	105,126	55,200,000	Jamestown, Dunkirk
Chemung...	436	54,662	24,700,000	Elmira
Chenango ..	854	35,375	19,500,000	
Clinton	995	48,230	15,300,000	Plattsburg
Columbia ..	691	43,658	27,200,000	Hudson
Cortland ...	480	29,249	16,300,000	Cortland
Delaware...	1,557	45,575	19,900,000	
Dutchess...	853	87,661	59,100,000	Poughkeepsie
Erie	996	528,985	404,500,000	Buffalo, Tonawanda
Essex	1,667	33,458	17,400,000	
Franklin ...	1,783	45,717	16,700,000	
Fulton	567	44,534	18,200,000	Johnstown, Gloversville
Genesee	497	37,615	29,500,000	
Greene	600	30,214	16,200,000	
Hamilton ..	1,767	4,373	4,900,000	
Herkimer ..	1,459	56,356	30,700,000	Little Falls
Jefferson ...	1,147	80,296	50,200,000	Watertown
Kings	37	1,634,351	1,412,200,000	Brooklyn
Lewis	1,294	24,849	12,000,000	
Livingston..	644	38,037	29,600,000	
Madison ...	628	39,289	21,500,000	Oneida
Monroe	721	283,212	216,700,000	Rochester
Montgomery	396	57,567	31,100,000	Amsterdam
Nassua	352	83,930	117,900,000	
New York..	40	2,762,522	5,352,500,000	New York
Niagara	504	92,036	69,800,000	Niagara Falls, Lockport, N.Tonawanda
Oneida	1,196	134,157	75,500,000	Utica, Rome
Onandaga ..	824	146,247	145,500,000	Syracuse
Ontario	674	52,286	39,800,000	Geneva
Orange	791	115,751	56,200,000	Newburgh, Middletown, Port Jervis
Orleans	399	32,000	21,900,000	
Oswego	962	71,664	34,000,000	Fulton, Oswego
Otsego	956	47,216	25,500,000	Onconta
Putnam	241	14,665	14,800,000	
Queens	58	184,041	334,900,000	New York (Borough of Queens)
Rensselaer..	643	122,276	81,500,000	Troy, Rensellaer

ASSESSED VALUATION—*Concluded.*

County.	Area in Sq. M.	Population, 1910.	Assessed Valuation.	Cities.
Richmond . .	61	85,969	68,100,000	New York (Borough of Richmond)
Rockland . .	200	46,873	29,800,000	
Saratoga . . .	800	61,917	32,200,000	
Schenectady	200	88,235	60,600,000	Schenectady
Schoharie . .	647	23,855	12,500,000	
Schuyler . . .	335	14,004	8,500,000	
Seneca	346	26,972	17,600,000	
Steuben	1,490	83,362	45,100,000	Corning, Hornell
St. Lawrence	2,880	89,005	49,000,000	Ogdensburg
Suffolk	1,200	96,138	95,600,000	
Sullivan	1,082	33,808	11,000,000	
Tioga	542	25,624	14,600,000	
Tompkins . .	494	33,647	20,300,000	Ithaca
Ulster	1,157	91,769	31,700,000	Kingston
Warren	940	32,223	15,800,000	Glens Falls
Washington.	861	47,778	23,300,000	
Wayne	621	50,179	30,700,000	
Westchester.	463	283,055	332,200,000	Yonkers, Mt. Vernon, New Rochelle
Wyoming . .	606	31,880	19,600,000	
Yates	342	18,642	12,200,000	
	47,620	9,113,279	$10,121,277,000	

A COMPARISON BETWEEN THE SAND FILTRATION METHOD AND THE BUBBLING METHOD FOR ENUMERATING BACTERIA IN AIR.

JOHN WEINZIRL, PH.D., *Seattle, Wash.*, AND J. BOSLEY THOMAS, *Baltimore, Md.*

Read before the Laboratory Section, American Public Health Association, Washington, D. C., September, 1912.

Rettger has described in the *Journal of Medical Research* (N. S. v. 22, p. 461) a method for enumerating bacteria in air whereby a measured volume of air is drawn through 5 cc. of physiological salt solution, and portions of the liquid subsequently plated for counting. He made no comparisons with other methods, but showed that when the air was drawn through two tubes connected tandem, very few or no bacteria passed into the second tube.

To compare the results obtained by this method with the results obtained by the sand filtration method, we have made a number of parallel tests. Each of us worked independently, devising his own apparatus and technique; and the results were finally compared. In consequence of this plan the details of making the trials differed slightly, but we were led to essentially the same conclusions.

The apparatus, as devised by Rettger, consists of a glass tube with a small round bulb at one end. The bulb has eight or ten small perforations which allow the air to be passed at a rapid rate and yet divide it to such an extent that absorption of dust and bacteria is complete. This glass tube, or aëroscope, is fitted into a small, heavy-walled test tube by means of a rubber stopper which bears also a short glass tube bent at right angles. The upper end of the aëroscope is bent at an angle of 45 degrees to protect it from the direct settling of bacteria and dust. After addition of the salt solution, the entire apparatus is sterilized in the autoclave for fifteen minutes. The tubes, when not in use, are protected from contamination by cotton plugs.

The sand filters consist of a glass tube 15 mm. in diameter and 70 mm. long, in each end of which is placed a perforated rubber stopper. Through one stopper a glass tube 6 mm. in diameter and 40 mm. long is passed until flush with the smaller end of the stopper. The other stopper is fitted with a similar sized tube, the outer end of which is bent at an angle of 45 degrees. This tube is the top of the filter, and serves to protect it from the direct settling of dust.

Over the lower stopper is placed a bolting cloth disc which has been cut slightly larger than the end of the stopper so that it may be turned down between the stopper and the filter tube and held securely in place. The filtering material consists of a 10 mm. layer of sand which has been

TABLE NO. I.

(Results obtained by Weinzirl.)

Trial.	Sand Filter.		Water Filter.		Time for 8 Liters.	Excess for Sand.	Excess for Water.
	1st.	2d.	1st.	2d.			
3	367	.....	220	.....	10	156	.....
4	30	.....	26	.....	8	4	.....
5	27	.....	34	.....	10	.....	7
6	98	.....	26	.....	8.5	72	.....
7	176	.....	154	.....	9.5	22	.....
8	6	.....	2	.....	10	4	.....
9	141	.....	87	.....	8.5	54	.....
10	22	.....	223	.....	11	.....	201
11	477	.....	47	.....	8.5	443	.....
12	54	.....	88	.....	10.5	.....	34
13	52	.....	71	.....	10.5	.....	19
14	31	.....	46	.....	.....	.....	15
15	172	.....	86	.....	11	86	.....
16	119	.....	161	.....	9	.....	42
17	40	.....	38	.....	9	2	.....
18	222	.....	284	.....	10	.....	62
19	5	0	23	3	7	.....	18
20	71	0	130	2	.....	.....	59
21	25	0	41	0	10	.....	16
22	.....	.....	219	3	6	.....	.....
23	.....	.....	123	8	8	.....	.....
24	.....	.....	90	2	10.5	.....	.....
25	.....	.....	118	0	.....	.....	.....
26	.....	.....	50	1.5	.....	.....	.....
27	.....	.....	39	1.5	8	.....	.....
28	.....	.....	19	0	8	.....	.....
29	.....	.....	0	0	.....	.....	.....
30	0	0	.....	.....	.....	.....	.....
Total excess.....						843	473
Number of excesses.....						9	10

To convert figures to bacteria per liter multiply by $\frac{1}{3}$

passed through a hundred mesh and retained on a two-hundred-mesh sieve.

In the trials the filter tube openings were as nearly together as possible, being usually an inch or less, and both the aëroscopes and sand filters

were used tandem. The bacteria were supplied by beating cloths which had been rubbed over the laboratory floors and steps. Eight-liter, graduated bottles were used as aspirators, the rates of filtration being equalized by means of screw clamps applied to the siphons. It was difficult to maintain exactly uniform rates of filtration, but care was taken to obtain as nearly uniform rates as possible before the air was charged with dust.

The results obtained are shown in detail in the following tables. Our results agree fairly well, although one of us (Weinzirl) secured almost an equal number of excesses by each of the methods, while the other obtained higher counts by the sand filters only. Weinzirl obtained an average of

TABLE NO. II.

(Results obtained by Thomas.)

	Sand Filter.		Water Filter.		Liters Filtered.	Time in Minutes.
	1st.	2d.	1st.	2d.		
	375	4	180	5	8	15
	150	8	150	6	8	22
	210	4	90	5	8	17
	250	2	60	2	5	12
	315	25	275	15	8	14
	340	0	170	1	8	16
	620	0	250	5	6	13
	210	3	160	1	5	9
	475	9	475	8	8	17
	1,500	2	725	3	8	13
	2,100	10	1,300	5	7	14
Total	6,545	67	3,835	56	–	—
Average...	595	6	349	5	–	—

A third tube (an aëroscope) in the sand filtration showed no bacteria in the first two tests.

113 bacteria by the sand filter and 94 by the aëroscope; and Thomas secured 595 bacteria by the sand filters and 349 by the aëroscopes.

As the excesses are not large, and as the second tubes show only small numbers of bacteria, the two methods compare favorably so far as accuracy is concerned. The question then resolves itself largely into one of comparative convenience of the two methods. While it is somewhat easier to make plates from the water tubes, we find the sand filters in every other way easier to operate. The aëroscopes are more difficult to make, or more expensive if purchased; they are more easily broken; and when being handled, they frequently get out of order. Again, sand filters, if protected, may

be used some time after being sterilized, while the aëroscopes tend to lose water by evaporation during sterilization and storage, thus vitiating the accuracy of the work. In actual sanitary work, when many samples are to be taken, and at a distance from the laboratory, we believe that the aëroscopes would give more trouble than the sand filters. Although no work has been done to confirm the belief, it seems not improbable that under certain conditions the absorption of sulphur dioxide or other gases in the five cc. from ten or twenty liters of air might have a restraining action upon the growth of some of the organisms absorbed.

THE EFFECT OF FREEZING UPON TYPHOID VACCINE.*

A. Parker Hitchens, M. D., and George Hansen, Glenolden, Pa.

Read before the Laboratory Section, American Public Health Association, Washington, D. C., September, 1912.

Since the strength of biological products intended for prophylactic and therapeutic use is affected by the conditions under which they are kept after their preparation, a knowledge of the changes that may occur is of great importance.

Heat, light and age are the common causes of deterioration, while the most favorable factor in the preservation of strength is cold in direct ratio to its degree. Some products change very slowly; others rapidly, even when kept under the best conditions.

Such facts have been largely obtained by a study of the changes in the value of antitoxic serums, these being susceptible of accurate standardization. With regard to the effect of heat, light, age, etc., upon bacterial suspensions we can reason only by analogy, for up to the present time very little work of this kind has been done with them.

Lamb and Forster† suggested a method for the standardization of typhoid vaccine. This was based upon the quantity of the vaccine required to fix the normal bacteriolytic amboceptor in a definite quantity of goat serum. Since only materials containing no antiseptic can be used in such a test the field of its application is very narrow.

Semple and Matson‡ have attempted to determine the effect on the stability of typhoid vaccine of certain modifications in the method of preparation. They injected rabbits and guinea pigs in series, determining the opsonic indices and testing the blood of these animals for its content in agglutinins. In addition the animals were injected with living virulent typhoid bacilli to further ascertain their resistance to infection.

While the injection of rabbits and the subsequent estimation of the antibodies in their blood is of value in deciding the difference in strength between two vaccines, such tests can be expected to detect only gross variations—differences so great as of 25 per cent. or even 50 per cent. This, however, is of much assistance for it enables us to demonstrate the difference between a vaccine almost inert and one of considerable activity.

If we wish to determine the effect of a certain condition upon an antigenic substance we may exaggerate or repeat the exposure many times—far beyond that to which the vaccine would be subjected under ordinary

*From the Mulford Biological Laboratories, Glenolden, Pa.

†Sci. Mem. by Officers of the Med. & San. Depts. of the Gov. of India, N. S. No. 21, 1906, pp. 1–15.

‡*Lancet*, August 14, 1909, Vol. II, pp. 436–444.

circumstances—and if after this procedure we find no great difference between the treated vaccine and the control we have evidence that may be relied upon.

Last winter we were asked many times whether or not freezing would affect the strength of a bacterial vaccine. The number of these inquiries received made it appear that an effort to get exact information upon this point would be worth while.

At the start it was necessary to confine ourselves to certain definite limits. For the preparation of the vaccine a single strain of the typhoid bacillus was used. This organism was selected because it produces antibodies which may be estimated with very little trouble. Likewise only the production of agglutinins was followed chiefly because the technique of the estimation is least complicated and subject to error. The test animals have been rabbits.

TABLE I.

Vaccine Held in Refrigerator.			Vaccine Frozen and Thawed.		
No. of Rabbit.	Titer before treat.	Titer after treat.	No. of Rabbit.	Titer before treat.	Titer after treat.
261	1–20	1– 400	263	1–20	1–400.
323	0	1–3200	378	1–20	1–800.
208	1–10	1– 800	213	1–20	1–800.
360	1–10	1– 800	253	0	1–800.
402	1–20	1– 400	420	1–30	1–800.
393	1–30	1–1600	426	1–20	1–400.
23	0	1– 800	252	1–50	1–400.

The freshly prepared typhoid vaccine was distributed into sterile 1 cc. glass tubes with rubber stoppers. Half the lot was then put into an ordinary refrigerator, the temperature of which ranges from about 5 degrees C. to 7 degrees C., the other half was repeatedly frozen and thawed. After being frozen the tubes were placed in a cold storage room and kept congealed for twenty-four hours; then they were thawed and were allowed to remain fluid for twenty-four hours; the next day they were frozen again, and so on. This procedure was repeated until they had been frozen and thawed ten times.

Before the first injection the blood of the rabbits selected for the injections was tested for normal agglutinins for the typhoid bacillus. Seven rabbits received vaccine that had been held in the refrigerator, and seven received that which had been alternately frozen and thawed. Three doses were given each rabbit, the amounts and intervals being identical with those generally used for the immunization of man—that is to say,

three doses at ten-day intervals, the doses being 500 million, 1,000 million, and 1,000 million, respectively. Ten days after the last injection the rabbits were bled and the agglutinin titer of their serum with regard to the typhoid bacillus ascertained. The conditions under which the serum from both sets of rabbits was tested were identical. The same suspension of typhoid bacilli was used and readings were made at the same time. The results are given in the table on page 176:—

As was to be expected individual rabbits showed wide variations. In the series treated with vaccine kept at about a uniform temperature two rabbits had a much higher titer than any of the others—even than those of the same series. These two bring the average of the "refrigerator" series to nearly twice that of the "frozen vaccine" series.

While the small number of rabbits used does not by any means make the result conclusive, the suggestion is clear that if freezing affects vaccine at all the weakening is slight. Under the ordinary conditions of the market a vaccine would be frozen only once or twice and thus the deterioration in strength would be negligible.

THE EFFECT OF MIXED TYPHOID VACCINE WITH REGARD TO THE FORMATION OF AGGLUTININS.*

A. Parker Hitchens, M. D., and George Hansen, Glenolden, Pa.

Read before the Laboratory Section, American Public Health Association, Washington, D. C., September 1912.

Although the existence of infection with paratyphoid bacilli simulating true typhoid was well recognized when vaccination against typhoid fever was commenced, it is only lately that its importance has been realized. The idea that paratyphoid fever is a very rare condition and that it usually runs a mild course is probably responsible for the fact that we have known so little about its prevalence until recently. The desire to ascertain the true nature of those cases diagnosed as typhoid fever which develop in spite of prophylactic vaccination is partly responsible for the increased attention that has been given to paratyphoid infections.

In November, 1911, Lyons† in reporting an epidemic of paratyphoid A infection in New Orleans, first suggested the use of a mixed vaccine—that is, one containing not only the typhoid bacillus, but the two paratyphoids as well.

Before adopting such a suggestion it should be ascertained experimentally, as far as possible, whether or not there is an objection to the use of a vaccine containing all three bacilli. May it not be possible that the injection of other organisms with the typhoid bacilli will somewhat impair the power of the cells locally, so that the maximum amount of antibodies for each individual type of bacteria injected, will be less than the maximum amount obtainable if one type were injected alone?

To get some idea as to whether or not objections to the mixed vaccine might be based upon such ideas we decided to inject single and mixed vaccines into rabbits and afterward to titrate their serum to learn the relative quantities of agglutinins formed thereby. The animals were divided into seven series, each series receiving three doses of vaccine according to Table No. I.

Injections were given ten days apart; the rabbits were bled ten days after the last injection; the tests were made under identical conditions, the macroscopic method being used. Some of the rabbits showed a slight amount of agglutinins normally for the typhoid bacillus and a few for the paratyphoid B—none agglutinated paratyphoid A in a dilution of even one to two. In the final tests the lowest dilutions used were 1–20.

*From the Mulford Biological Laboratories, Glenolden, Pa.

†New Orleans Medical and Surgical Journal, November, 1911, pp. 343–350.

TABLE NO. I.

No.	Vaccine Contained.	First Dose.	Second Dose.	Third Dose.
1	Typhoid.....	500 million	1,000 million	1,000 million
2	Para. A.....	250 "	500 "	500 "
3	Para. B.....	250 "	500 "	500 "
4	Typhoid.....	500 "	1,000 "	1,000 "
	Para. A.....	250 "	500 "	500 "
5	Typhoid.....	500 "	1,000 "	1,000 "
	Para. B.....	250 "	500 "	500 "
6	Para. A.....	250 "	500 "	500 "
	Para. B.....	250 "	500 "	500 "
7	Typhoid.....	500 "	1,000 "	1,000 "
	Para. A.....	250 "	500 "	500 "
	Para. B.....	250 "	500 "	500 "

TABLE NO. II.

No. of Rabbit.	Vaccine Injected.	Agg. Titer before Treat.			Agg. Titer after Treat.		
		T.	A.	B.	T.	A.	B.
534	T.....	1/2	0	1/2	1/640	0	0
540	T.....	1/4	0	0	1/320	0	0
547	A.....	1/4	0	0	1/ 80	1/640	0
533	A.....	0	0	0	1/ 80	1/320	0
535	B.....	1/4	0	0	0	0	1/320
551	B.....	1/2	0	0	0	1/ 20	1/160
542	B.....	1/2	0	1/2	0	1/ 20	1/320
546	T.A.....	1/4	0	0	1/ 80	1/160	0
532	T.A.....	1/8	0	0	1/160	1/160	0
549	T.A.....	0	0	0	1/320	1/320	0
541	T.B.....	1/2	0	0	1/320	1/ 20	1/ 40
538	T.B.....	1/16	0	0	1/640	1/ 20	1/ 40
550	T.B.....	1/2	0	0	1/640	0	1/ 80
545	A.B.....	1/4	0	1/2	1/ 80	1/640	1/160
544	A.B.....	1/4	0	1/4	1/ 80	1/320	1/160
537	A.B.....	1/8	0	1/2	1/160	1/160	1/320
543	T.A.B....	1/4	0	0	1/640	1/320	1/ 80

T. = Typhoid; A. = Paratyphoid = A; B. = Paratyphoid = B.

These results would indicate that vaccination with a mixture containing the ordinary number of typhoid bacilli and half the quantity of the paratyphoids would confer as much immunity to each individual germ as though the single vaccine were used.

BOOK REVIEWS.

Food in Health and Disease *By Nathan S. Davis, Jr. A.M. M.D., Professor of the Principle and Practice of Medicine in Northwestern University Medical School; Physician to St. Luke's Hospital, Mercy Hospital and Wesley Hospital, Chicago; Member of the American Medical Association, American Climatological Society, etc.* Second Edition. Thoroughly revised and rewritten, containing much new material. Octavo. XII+449 Pages. Cloth, $3.50.

This is a second edition of Doctor Davis' book, and makes a volume which should be useful to both physicians and nurses. As its title states, it is divided into two parts. In the first one, the fundamental principles of what one should eat, and what one does eat are carefully discussed. No article of food is too insignificant to avoid description, and it is possible to find out in this book, the caloric as well as the physiological value of each. It also gives a historical, biological, and botanical description of each. In this book, it is possible to find out the average diet of all the ordinary groups of human beings as divided by occupation, race, or latitude. For instance, one can compare the diet of a Massachusetts mill worker with that of a farm laborer in Prussia.

The second part of Doctor Davis' book is given up to what might be called the therapeutic administration of food in disease, and his ideas about the exact diet which should be prescribed are detailed for each disease. He discusses thoroughly ninety different diseases, and the suggestions which he makes are useful to one who wishes to carefully select a proper menu for his patient.

The book in its entirety is one which is well written, interesting to read, and useful to own for reference.

Hilbert F. Day, M.D.

Proceedings of the 32nd Annual Convention of the American Water Works Association, Held at Louisville, Kentucky, June 3–7, 1912. *Published by the Association,* 471 *pages with illustrations and insert maps and diagrams.*

The annual proceedings of the American Water Works Association is assuming more and more the dignity of a year book of best American water-works practice. The present volume of papers presented at the annual meeting is an excellent illustration. The extensive discussions constitute an important feature.

An illustrated article by Edward Wegman on Ancient and Modern Water Works is of historical as well as contemporary interest. For comparison with the works of ancient and modern Rome the works of New York City are described quite fully. A paper by William W. Brush supports the contention that the floor area represents a better basis for estimating water consumption than the population. It is more readily obtained and includes large areas occupied for business purposes which would not otherwise be enumerated. It is especially useful in consideration of reasonable consumption in limited districts and determining the size of tap that should be granted for new buildings.

Mr. H. G. H. Tarr, in Fifty Years' Reminiscences, refers to the organization of the American Association. Mr. I. M. DeVarona describes the organization of the Bureau of Water Supply of New York City, with interesting statistics of the water supply. A short paper on the Principles of Efficiency Applied to Water Works by Harrington Emerson follows. A paper by Alexander Potter on the Value of a Continuous Settling Basin and a Discussion of the Economic Principles of Design is sufficiently well described by its title. The discussion is based upon the Muskogee Basin, Oklahoma. The paper elicited considerable discussion.

W. O. Beyer contributes a short article

on Turbine Driven Centrifugal Pumps, with detailed comparisons of the work of such pumps with reciprocating pumps. Additional information of value was brought out in the discussion. F. M. Griswold writes on Progress in Adoption of the National Standard Hose Company and Hydrant Fittings, and W. L. Worrell describes the laying of a ten-inch water main under two streams at Rome, Georgia.

The subject of electrolysis, an ever recurring one among waterworks engineers, is treated at some length and in great detail of both theory and experience, by Albert F. Ganz. The necessary procedure for an electrolysis survey and remedial measures are described.

Doctor D. D. Jackson writes on Chlorination of the Water Supply at Cleveland, Ohio. The interesting suggestion is made that plans are under way to determine the suitability of liquid chlorine as a substitute for the hypochlorite solution. It is estimated that the cost of treatment will range from 25c to 40c per million gallons. The present hypochlorite plant is described together with some interesting comparative experiments on hypochlorite and liquid chlorine gas. The subject of hypochlorite is further treated by S. Y. High who describes the plant at Kansas City, Mo., and the discussion testifies to the general interest in hypochlorite treatment and contributes much interesting information of results at other plants.

Edward S. Cole writes on the Cost of Leaks and Methods for Detecting Them. Another contribution to the same subject is made by F. H. Shaw. The relation of sewage disposal to the water-works problems is indicated by the presence in this volume of an article by Charles G. Wigley, entitled, To What Degree Must Sewage be Purified. A. Maclean describes the water works of Edmonton, Alberta; Henry L. Lyon treats of ice troubles at Buffalo; S. T. Powell on the Endo Medium for B. coli and L. Van Gilder on a forty-eight inch wood stave force main at Atlantic City. Mr. George W. Alvord opened a discussion of depreciation and bookkeeping methods.

The volume closes with a question box in which numerous practical questions are submitted and answered.

Earle B. Phelps,
Massachusetts Institute of Technology.

PUBLIC HEALTH NOTES.

Jails Versus Schools.

A recent issue of *Public Health*, the bulletin of the Michigan State Department of Health, contains a striking example of the ridiculous limitations often placed on public health work. The board recently condemned the Ingham County jail because some of the cells were below the ground-level and were not in sanitary condition. The county was compelled to build a new jail that was sanitary. In District 6, Lansing Township, Ingham County, there is a schoolhouse which has a basement room lighted and ventilated by five small windows. In this room were crowded fifty-five small children. The conditions as to light and ventilation were as bad in the school room as in the jail cell. Yet the State Board of Health has no power to order the school board to provide sanitary schoolrooms, nor, apparently, has any other body. These facts are shown on the front page of the bulletin in an impressive cartoon bearing the suggestive question, "If the state can protect criminals, why can't it protect school children?" Why, indeed? asks *The Journal of the American Medical Association*. It is gratifying to know that the local school board is doing everything in its power to improve the situation. But the fact remains that under the present law in Michigan, all plans for jails are subject to the approval of the State Board of Health, while schoolhouses may be built and are built without any sanitary supervision whatever. Similar conditions are all too common in other states.

Tuberculosis and Housing in Paris.

Paris health authorities have recently made an interesting report which demonstrates both the excellence of their system of records and the close relation between unsanitary houses and tuberculosis.

The health bureau of Paris has had in force now for four years a system of records by which a complete history of every one of the 80,653 houses in the city is kept, showing the sanitary equipment of the house, the number of deaths and cases of sickness in each house, the disposition of each case, and other data by which the true sanitary character of the house or neighborhood may be determined. On data compiled from these and other records, the bureau announces that the 101,496 deaths from tuberculosis during the last ten years, all occurred in 38,477 houses.

A further careful examination of the records of these 38,477 houses clearly establishes the fact that in Paris tuberculosis is localized, that it is concentrated in certain quarters, always the same, and outside of which its ravages do not exceed those of any other disease.

Railway Sanitation.

The sanitary condition of railway beds and the physical welfare of railroad employees are briefly discussed in the December *Medical Review of Reviews*. It has recently been held that it is constitutional for Congress to legislate concerning the physical and sanitary conditions of interstate transportation, and a prominent railroad official, coinciding with this view, advocated a physical examination, by Government inspectors, of railroad employees. "Of the accidents reported by the railways to the Interstate Commerce Commission, sixty-five per cent. to seventy per cent. are stated to have occurred through carelessness of the operators and this is in many cases due to physical defects or to ill-health." The writer believes that these examinations should be made at the beginning of employment and at regular intervals thereafter, and that although the railroads now require periodical medical examinations, without action by the national government no uniformly high standard can be maintained.

The unsanitary conditions of railroad beds has been the subject of much complaint, and a recent order of the Federal Public Health Service, directed to its commissioned medical officers, is quoted as follows:

Such officers "when traveling under official orders on trains and vessels engaged in inter-

state traffic, are to make such observations as may be practicable of the sanitary conditions of the trains and vessels on which they travel and the stations and wharves at which they stop. The results of these observations will be noted in a report to be submitted to the Bureau upon completion of the travel authorized. This order does not authorize officers to conduct formal inspections or to give instruction or offer advice to employees of common carriers. The making of the observations mentioned is desired solely for the information of the Bureau and for the compilation of facts relative to the sanitary conditions prevailing in interstate traffic."

The Care of Milk in the Home.

"1. Take in milk and cream as soon as possible after being left at your door and place in refrigerator.

"2. Keep milk and cream cold until ready for use.

"3. If ice cannot be had, wrap the bottle in a wet cloth and stand it in an open dish of water by an open window, out of the sun. Evaporation of the water will cool the milk.

"4. Keep milk and cream covered until wanted, and in the bottle in which it is delivered. In open bowls or pitchers it will absorb odors from food and collect flies and dust.

"5. Pour from the bottle only what milk or cream is needed for immediate use.

"6. Milk or cream that has become warm should never be poured back into the bottle of cold cream or milk.

"7. Utensils used for milk should first be rinsed with cold water, then washed with warm water and soap or washing powder, and finally rinsed with boiling water, thoroughly drained and allowed to become cold before being filled with milk.

"8. Have a separate bottle of milk for the baby.

"9. Wash and return all milk and cream bottles daily.

"10. No person ailing or sick with contagious disease, or one having the care of such person, should have anything to do with the care of milk or of milk utensils."

Circular No. 1. *Massachusetts State Board of Agriculture.*

Germs in Finger-Bowl.

"The United States public health service is out with a denunciation of the finger-bowl. Dr. C. H. Lavinder says that as a means of spreading infection and contagion the finger-bowl is in the same class with the common drinking cup and the roller towel.

"Dr. Lavinder asserts that in many supposedly high class restaurants there are in use only about a half-dozen finger-bowls and these do service for many patrons."

Boston Record, January 8, 1913.

Registering the Baby.

"This country has been much too slow in recognizing the great importance of an adequate registration of births. In only a few states is registration even fairly complete; in many states the laws are defective or poorly enforced; in a third of the states there is no law at all. In Europe, on the other hand, especially in those countries that have a conscript army, the registration of births is enforced with completeness and precision as a military measure.

"The Children's Bureau, recently established by the national government, will try to perfect a system of registering births, and get it adopted throughout the country.

"The attempt deserves general and hearty support, for this is a matter that deeply concerns every home in which a child is born. A birth certificate or certified copy of a birth registration record, may become vital to prove or disprove the right of inheritance, to enter school, to testify in court, to claim insurance money or a pension, to buy or sell real estate, to make contracts, to marry, to vote, to enter the army or the navy, to get and pursue employment, to hold office, to establish citizenship. Indeed, as the country grows older, transcripts of birth certificates must be more and more relied upon as the only admissible evidence of identity in all legal matters.

"Moreover, there is the highly important matter of the public health. Preventive medicines and preventive measures depend for their efficacy upon the promptness with which they are applied, and in being always

applied. One third of the youthful blindness in the United States results from 'baby's sore eyes,' a disease that shows itself in from one to ten days after birth. Every person blind from this cause is needlessly blind, for the disease is easily prevented; but the authorities must know in time.

"In localities where, by means of visiting nurses, an organized effort is made to reduce the infant death rate, success depends on quick and complete registration of births. Nearly one fourth of the babies that die within their first year live less than a week, yet in most states, even in so old a community as New England, thirty days is the period within which the birth of a child may be legally registered. That is too long; in a matter so important, no chances should be taken."

The Youth's Companion, January 9, 1913.

Typhoid in Cleveland.

The November (1912) *Cleveland Medical Journal* contains an article by D. D. Jackson on the Cleveland Water Supply. Mr. Jackson considers the typhoid problem at some length and gives an interesting tabulation of the various sources of typhoid in that city. The percentage for which the water is responsible varies, in Mr. Jackson's estimation from zero to 15 per cent. for different years.

The analysis is as follows:—

"1. General Sanitation (transmission by flies, etc.) 30%
"2. Water Supply 10%
"3. Milk, Oysters and Raw Vegetables 5%
"4. Contracted out of town 10%
"5. Contact cases 45%

Housing the Russell Sage Foundation.

Roscoe C. Edlund, of the Sage Foundation, describes for the *Survey*, (December 7, 1912) the new building now being erected for this organization. Although five years ago, when the work of the Foundation was begun, two small offices were sufficient, at the present time the various departments occupy five sets of offices in three different buildings, in New York City. This fact alone emphasizes the necessity for new quarters, under one roof, so that the various branches of the organization may be brought into closer touch with each other's activities, in a building specially designed for their work.

The new building, on the corner of Lexington Avenue and East 22d Street, is to be nine stories high, with sufficiently strong substructure to permit the addition of three stories more. The main floor will contain a lecture hall with 100 seats and a large exhibition hall. The offices and workrooms will occupy the second to seventh floors, inclusive, while on the eighth and ninth floors will be the library, lunch room and rest rooms for women.

Mr. Edlund in the same article summarizes the departments of the Foundation as follows:

"The Child Helping Department, which is endeavoring to improve conditions surrounding dependent, neglected, and delinquent children; the Department of Child Hygiene, whose aim is to promote public health, recreation and education, especially of children; the Charity Organization Department, whose aim is to promote the better organization of charities; the Division of Remedial Loans, which is conducting a campaign against loan sharks and encouraging the organization of remedial loan societies; the Investigation of Women's Work, which is gathering facts regarding the conditions of work of women in New York; and the newly organized Department of Surveys and Exhibits which will be a clearing house for advice and information on social surveys and exhibits."

A National Department of Health.

"If a father comes home from business to find one of his children seriously ill, he does not treat the matter as he would a business question. That child's illness is a bigger and more important matter to him than any mere question of dollars and cents. There is only one thing that he regards as of more consequence than the health of the

members of his family, and that is their character and reputation. When illness enters his household, he needs no further argument to persuade him that human life is more valuable than property.

"And yet if Americans were judged by the Government they have made for themselves, they would appear to place a higher value upon property than upon human life. The Federal Government is very well equipped on the whole, to help farmers protect the health and lives of cattle; but it is very badly equipped to enable the American people to defend their own health and their own lives."

Thus the *Outlook* for December 7, 1912, introduces an editorial on "Health and the Federal Government." The editorial quoted further discusses the necessity for a single, unified, administrative body devoted solely to matters of health, and finally describes the two chief functions of such a department, when established, to be: First, publicity, the acquiring and distributing of information on public health matters. Second, protection, regulation, and the enforcement of laws dealing with the health of the people.

In the same number of the *Outlook* is a comprehensive discussion of "The Problem of National Health" by Dr. Earl Mayo.

"False Food Standards and the High Cost of Living."

Under this title the *Journal of the American Medical Association* for December 7, 1912, argues with great sanity for the use of certain types of food stuffs now either ignored or repudiated by the average American when marketing. The writer points out the necessity for recognizing the economic causes underlying the high cost of living and wisely remarks that "legislative enactments can accomplish no permanent gain where they are based on false principles."

One of the food items most interestingly discussed is meat. There is, of course, a great deal of preference on the part of most people for certain "cuts" of meat, and in the mind of the average buyer the more expensive portions are supposed to contain a greater amount of nutriment. However, as the nutritive value depends upon the content of protein and fat, and as the cheaper "cuts" are not notably deficient in these substances, compared with the more expensive ones, "the cheaper cuts of beef are by far the most economical sources of both lean and total edible meat, including fat and lean. . . . It is high time that those purchasers to whom matters of justifiable economy make an appeal should be educated to appreciate the irrational standards that characterize the demand for beef, to realize that the low priced cuts are by far the most economical sources of nutriment from flesh and accordingly to profit by the prevailing discrepancies in market prices."

Cold Air.

"There is a certain amount of stimulation in cold fresh air that warm air does not possess. The cold acts as a tonic to the whole system, stimulating the action of the heart, increasing the appetite, and aids generally the performance of all the bodily functions. It is accepted almost universally that the greatest gain in health by consumptives is made in cold weather; and ex-patients frequently report that they lose in the summer and gain in the winter."

After thus lauding the value of cold fresh air the November number of the *Journal of the Massachusetts State Sanatoria* gives some very practical directions as to the ventilation of rooms in winter, the wearing of sufficient, though not excessively heavy clothes, etc.

Regarding ventilation it is stated that "it is a common mistake to think that a window open and the room cold means fresh air, it does not at all. Pure air in a room can be had only by allowing the air that has been used to escape, and fresh air to take its place, no matter what the temperature may be." Stale cold air is worse than stale warm air, for it compels the body to resist both cold and bad air, instead of bad air alone.

Midwives and Infant Mortality.

New Jersey was one of the thirteen states mentioned by Doctor Jacobi in an address before the American Medical Association that had laws regulating midwives, but no school for their instruction. This defect has now been remedied in that state, and the organization, aim and methods of the new school, are described by Dr. Siegfried Husserl in the *Journal of the New Jersey Medical Society* for December, 1912.

For a large proportion of the tenement population in the large cities the midwife takes the place of the physician and the confidential advisor. She is as frequently called in for professional advice as for practical service, and it is in the capacity of advisor that she can be of greatest use, if properly instructed, in the prevention of infant mortality. Doctor Husserl discusses the importance of providing the midwives knowledge concerning the necessity of breast-feeding and the principles of artificial feeding. "If Doctor Jacobi is right in stating that breast-feeding will save 100,000 babies that now die or become invalids from no other cause but unnatural feeding, then there is no doubt that a great deal can be done toward that goal by carrying this gospel to the tenement districts in an organized way, through the modern midwife or practical nurse."

The law providing for a school of midwifery in New Jersey sets forth thirteen subjects in which training is demanded. The most important of these are:

1. Physiology of menstruation.
2. Female pelvic anatomy.
3. Management of normal labor.
4. Management of the puerperium.
5. Sepsis and antisepsis in relation to labor.
6. Cause and effects of ophthalmia neonatorum.

Vacuum Bottles and Infant Feeding.

"It has come to the knowledge of the State Board of Health that the so-called vacuum bottles, designed to maintain liquids at a desired temperature, either hot or cold, for several hours, are being used to keep the baby's milk *warm* for feeding through the night or on a journey, or for other convenient periods.

"The result of keeping *warm* milk in such bottles for several hours is the development of bacteria in immense numbers consequently rendering the milk dangerous for infants.

"There is no medium better suited for the rapid growth of bacteria than warm milk, and for this reason many municipalities have established regulations requiring milk to be cooled immediately after being drawn from the cow and to be delivered to the customer at a temperature not exceeding 50° or 55° F.

"A low temperature is necessary to inhibit the growth of germ life, to prevent early souring, decomposition and other detrimental changes. It will, therefore, be seen that the keeping of warm milk for several hours in one of the receptacles referred to, is the exact reverse of reasonable sanitary precautions to preserve milk in a safe and palatable condition.

"The changes that take place in milk at a comparatively high temperature are such that when fed to infants frequently result in digestive disturbances, diarrhœa and other pathological conditions, often terminating fatally.

"The manufacturers of at least one of the so-called vacuum bottles, recognizing this danger, call attention in their descriptive literature to the fact that *warm* milk should not be kept in such a receptacle, unless it has been previously Pasteurized or sterilized; and they further state: 'Keep the milk *cold* in one bottle, and hot water in the other. At feeding time, mix the milk and hot water in proper proportions, which will not only heat the milk, but will dilute it to the required strength,' the procedure to be only in accordance with the advice of the physician."

Bulletin of the State Board of Health of New Hampshire. (October.)

The Seven Ages of Milk.

Dr. Charles Cristadoro, of Point Loma, Cal., in an article on "Certified or Clarified Pasteurized Milk," in the December *Dietetic and Hygienic Gazette*, describes the sanitary

history of milk production in the following popularly impressive way:—

"1. Neglect age.—Meaning anything and everything unsanitary; filthy stables and as filthy cows; dust, flies, unclean cans and pails and unclean milkers perhaps, using unclean milking methods, and careless cooling and storing of the milk.

"2. Water age.—When 25 per cent. to 50 per cent. of water was added to the milk to make it hold out.

"3. Skim age.—When all or part of the cream was skimmed and kept at the farm, and the milk sent to town.

"4. Preservative age.—When salicylic and boracic acid were used, and then formaldehyde to keep the milk chemically sweet.

"5. Tuberculosis age.—When milk was found to be, through the bovine bacillus, a transmitter of the white plague.

"6. Pasteurization age.—When all 'uncertain' milk was made safe through application of heat, 145 degrees Fahrenheit for 30 minutes, correctly, honestly and thoroughly done.

"7. Golden age.—When all milk shall be 'certified' in the full and sanitary sense and meaning of the term as to environment and methods, machine clarification to take place immediately after the milking, when the milk is fresh from the cow and before germ multiplication has commenced, either from the foreign matter or from the slimes already present in the milk; then cooling and bottling at the farm, pasteurization after bottling, to make assurance doubly sure."

Playgrounds in Buffalo.

That the Buffalo Playground Commission is inspired in its work by a most admirable spirit is indicated by an article on this subject in *The American City* for December. It is evident that the Commission's work is based on a conception of the fundamental meaning of the word recreation—genuine re-creation. The playgrounds, numbering thirteen, and costing $500,000 have an average daily attendance of 5,309, and are under the care of a director, an assistant director, and a caretaker for each playground. Each center is fully equipped with ice rinks, toboggan slides, teeter ladders, etc., and arrangements are made for games and folk dances, gymnastics, tramping and swimming parties, sewing classes, gardening, and many other forms of entertainment and instruction.

One highly commendable innovation is the provision for evening use, the grounds being turned over to working boys and girls, men and women, after 5.30 p. m. One of the playgrounds has been equipped with large electric lights and in the evening from 500 to 600 boys and girls and many grown-ups employed during the day, assemble for games and exercises. The report of the Commission indicates its broad social attitude as well as its appreciation of the still inadequate means at their disposal. It says, in part:—

"When this department is forced to use unsuitable quarters, when we have to accept the hospitality of various settlement houses for winter work, and when we have to rent one gymnasium, all at a time when a modern new school building equipped with gymnasium, swimming pool, showers and assembly hall, is closed down half of the time and the facilities afforded not used at other times, we believe that something is wrong, that the municipality needs greater coördination of the various departments. The Commission is greatly in favor of the movement toward increased use of the school buildings for recreation purposes, and by recreation purposes we mean everything which tends to the improvement of the mental, moral and physical well-being of the people."

Safety in the Streets.

The children's branch of the National Highways Protective Society has adopted the following rules, calculated to promote safety on public streets:

"1. All members must agree to use the nearest playground.

"2. No member shall play ball or any game where a missile is thrown in the streets.

"3. All members shall refrain from hitching on to vehicles, moving or stationary.

"4. No member shall jump on or off moving street cars or other vehicles.

"5. No member shall jump at, throw stones, or stand in front of automobiles, wagons and trolley cars.

"6. All members shall cross the streets only by crosswalks.

"7. All members shall endeavor to aid, as far as lies in their power, the maintenance of clean streets.

"8. No member shall throw paper or refuse of any description in the streets, or build bonfires, or upset ash or garbage cans."

The American City, December, 1912.

Dust-proof Ash Collection.

The interest the press is taking in sanitary matters is indicated by the following editorial from the *New York Sun*, December 21, 1912;

"The Commissioner of Health announces that all wagons used for hauling loose loads must in future be covered, and after January 1 no licenses will be given for wagons which are not properly equipped with tarpaulins.

"This is a highly desirable reform, considering the intolerable nuisance of flying dust. As the public ashcarts are among the very worst offenders it is reassuring to learn that Doctor Lederle 'hopes to induce the Street Cleaning Department to conform to the new ordinance.' All we hope is that some effort will be made to enforce the new rule. Some months since the use of cut-out devices in motor-cars was restricted by an ordinance, but only in theory, for after the first few weeks little or no attention was paid to it and now it is quite common to hear cars bellowing up the principal thoroughfares with perfect impunity."

Infant Mortality and the Schools.

"It cannot be repeated too often that the most fundamental cause of infant and child mortality, expressed through many channels, is ignorance and the most potent influence which will destroy and remove it is imparted and applied knowledge."

Such is the view of Henry Coit as expressed in the *Public Health Journal* of Toronto for December, 1912. Mr. Coit describes the work of the Babies' Hospital of Newark, especially its efforts to utilize the public schools in fighting infant mortality. He believes that there are two main channels of approach. In the first place, instruction should be given to girls and young women, as part of the regular courses, in infant and child hygiene and the care and management of children. This work should be begun with the "Little Mothers" of the eighth grade and should be carried out in high schools, finishing schools for girls, and women's colleges.

The second method pointed out by Mr. Coit in which the school buildings and equipment should be used, is the more general instruction of mothers of the industrial class in the congested school and tenement districts. Many of these mothers did not and most of them could not complete the curriculum of the school. This plan, as already carried out to a great degree in Newark, involves instruction "in hygiene, reasons for cleanliness, dangers of dirt, care of the newborn, importance of breast feeding, the care of milk, artificial feeding, weaning, children's diet, management, advantage of system, the bath, the clothing, the room, the air, ventilation, and sunshine, the baby's bed, its sleep, danger of anodynes, exercise and the care of the sick child." Surely, such knowledge, imparted through these channels, should be most effective in preventing infant mortality.

Typhoid and Surface—Privies.

In the Journal of the *American Medical Association* for January 4, 1913, Charles T. Nesbitt, M. D., Superintendent of Health, Wilmington, N. C., describes the methods used to control a typhoid fever epidemic in that city during the summer of 1911. As to the epidemiology of the disease he states that, "the typhoid problem in Wilmington as elsewhere is occasioned by the exposure of infected feces to flies, and by the pollution of the soil and water. In rural districts, towns and small cities where the use of the sewer is limited or does not exist, it is obvious that the first attempt at typhoid control must be directed toward the sanitary disposal of

human excreta, more especially that of typhoid patients."

In June, 1911, the disease was spreading rapidly, and in view of the fact that there are in Wilmington more than 5,000 surface-privies, the plan adopted for the control of the epidemic is of interest:

"Each sanitary closet-can, when removed for cleaning, was thoroughly scrubbed and disinfected, and before being replaced in a closet was filled to one-third of its capacity with a disinfecting solution of known typhoid bactericidal efficiency. In addition a circular letter was addressed to every physician in the city requesting him to notify the health office as soon as the symptoms in any suspected patient suggested typhoid, and to use every means in his power to secure the screening of the patient and the disinfection of all excreta. The health office agreed immediately on notification to coöperate with the physician in his efforts to render the case innocuous. To prevent any typhoid excreta from going through the sewers into the Cape Fear River the health office was to supply every household in which there was a case of typhoid with a steel can in which the excreta from the patient might be kept and disinfected. . . . As soon as a suspected case of typhoid fever is reported a galvanized steel can of 12½ gallons' capacity, containing three gallons of disinfecting solution and supplied with a tight lid, is sent to the house of the patient. An extra quantity of disinfectant is supplied for the disinfection of bed linen and clothing. Another can is provided, if desired, for use in disinfecting these articles. The can containing the disinfected excreta, is placed in an out-building, kept tightly closed at all times, and is removed, cleaned and redisinfected as often as is necessary, without cost to the citizens. New cans are furnished for every exchange in order to prevent the possibility of offense which might be occasioned by the use of a previously used can."

The results obtained are indicative of the success of the method, for during the five summer months of 1912 there were reported only 59 cases, as against 250 cases for the same period in 1911.

Vital Statistics in New York City.

"Referring to our recent comment on the need of accounting for the lives of this city, a correspondent says: 'What we really need is a State Statistician, with an adequate staff, devoting his entire time to vital statistics.' That may be important for the rest of the State, but it would not help this city. Its problems are different from State problems, and, very properly, the City Department of Health is not subordinate to the State Department.

"In this city, but not in the State, the preliminary work of counting deaths, births, and marriages is nearly done. But having the facts, there is no one to tell the public what they mean. For this interpretative work the committee of the Academy of Medicine suggests an appropriation of $40,000 a year.

"Of course, until their meaning is disclosed, the mere gathering of the facts is worth nothing. The leaders in the campaign for the public health could very effectively stir public sentiment, and in the right directions, when armed with the proper analyses and interpretations. The United States has competent statisticians for insurance companies, for railways, finance, taxation, and so on, but the number of vital statisticians in the public service could be counted on the fingers of one hand. England, France, and Germany have far outstripped us in this care for the public health. That is why, for one thing, the average life in Prussia has been lengthened more than in the United States, and more lives there are prolonged through the years of greatest efficiency."

Editorial in *New York Times*, December 18, 1912.

Impugning a Successor.

An editorial in the *New York Tribune* for December 24, 1912, is indicative of the rational attitude which many papers have taken on the subject of Doctor Alsberg, the new food chemist.

The editorial is in part, as follows:—

"Why not give Dr. Alsberg a chance? He has been in office only a few days and

there is a chorus busy saying that he won't do. Dr. Wiley led this chorus by intimating doubts of his successor's administrative ability. Since no possible good could come of saying this, Dr. Wiley might better have refrained from saying it. His words about the administration of the pure food law carry so much weight that he should be careful in their use. The last thing which we can imagine to be his wish is to cripple his successor at the outset of his career by depriving him of public confidence. That could only aid the food adulterators.

"Another of the new chief chemist's sins is a recent interview given by him to *The New York Times*. The language lacks 'punch.' Therefore we shall all soon be consuming food reeking with poisonous drugs. The 'therefore' is not so obvious as it should be. Dr. Alsberg has not, it is true, his predecessor's gift of striking utterance, but no one doubts his scientific attainments, and his honesty of purpose has not been successfully impugned. His courage, though of a quieter sort, may fully equal that of his brilliant predecessor. And if we ever do turn and rend him let us rend him not because he is not another Dr. Wiley, with the redoubtable ex-chemist's extraordinary personality, but because he weakly or corruptly lowers Dr. Wiley's standards of food purity."

The House-Fly and Bacteria.

In response to the general demand for more definite knowledge on this subject, Doctors Cox, Lewis and Glynn, working in the Thompson-Yates Laboratories in Liverpool, have made a very thorough comparative study of "the number and varieties of bacteria carried by the common house-fly in sanitary and unsanitary city areas." Their study is reported in the October number of the *Journal of Hygiene*. Descriptions of the areas investigated are given, together with the methods of catching the flies, of estimating the number of bacteria carried, etc. It is possible here to indicate only the most important conclusions reached in the summary of the work.

1. Over 450 naturally infected flies (*musca domestica*) were examined, and it was found that the amount of pollution of a liquid resulting from the flies' vomitus or excrement or from their wallowing in the liquid varied from 2000 bacteria in 5 minutes, to 350,000 in 30 minutes.

2. Flies from sanitary areas carried from 21,000 to 800,000 bacteria while from the congested, unsanitary districts the numbers were from 800,000 to 500,000,000 per fly.

3. The number of intestinal organisms on flies from the two types of districts held the same relationship, sanitary areas showing 100–10,000, unsanitary areas 10,000–333,000,000 per fly.

4. Pathogenic bacteria and those allied to the food poisoning groups were isolated from flies from the unsanitary areas, never from the sanitary areas.

5. Other organisms isolated were streptococci, staphylococci, sarcinæ, B. pyocyaneus, B. coli, etc.

6. Flies caught in milk stores were more highly contaminated than those from other food establishments.

7. If food is abundant flies migrate only very short distances, so that the number and degree of contamination often may be taken as criteria of the sanitation of the area.

8. Organisms identical to Morgan's infantile diarrhœa group were isolated. In districts where infantile diarrhœa is rare flies carry fewer bacteria than in sections where the intestinal disturbance is common.

9. "As the amount of dirt carried by flies in any particular locality, measured in terms of bacteria, bears a definite relation to the habits of the people and the state of the streets, it demonstrates the necessity of efficient municipal and domestic cleanliness, if the food of the inhabitants is to escape pollution, not only with harmless but also with occasional pathogenic bacteria."

Tuberculosis in Vermont.

A special state commission of Vermont appointed by Act of legislature in 1910 to consider the need for more hospitals for advanced cases, has recently reported that there are 1500 living cases of tuberculosis in that state of which 400 are in an advanced

stage of the disease. Part of the report of the commission follows:

"The commission beg leave to report that they have sought information from every town in the state and find that there are practically fifteen hundred cases, four hundred of which are advanced cases of tuberculosis all the time in the state. In this advanced stage these persons are a serious menace not only to those around them, but to the community. Many of them are without any home of their own, as well as devoid of other pecuniary resources. Hence they are in many instances obliged to seek shelter among the inmates of the poor house, or in some family to whom the Poor Officer gives a small stipend.

"Segregation is a logical measure for the prevention of tuberculosis. The patients most needing segregation are the advanced ones, as they are most contagious and the least able to exercise precautions.

"We most earnestly recommend the construction of a sanatorium for this class of tuberculosis people and herewith submit plans for the same and are informed by a reliable architect that one can be constructed according to plans given for $25,000.00. These plans are similar to the one recently built in Providence, Rhode Island. Having inspected this building, we are of the opinion that it is the most satisfactory of any which we know about.

"We further recommend that the Governor continue a commission to decide upon a location and the construction of such a sanatorium."

The members of the commission were Dr. Henry D. Holton, Secretary, State Board of Health, Samuel E. Darling and Alanson C. Bailey.

Social Insurance and the Doctor's Future.

"Abraham Jacobi, trustee of the New York Academy of Medicine, a physician who can look back on a long life of activity in progressive movements in medicine and out, warmly congratulated the academy at its recent anniversary meeting on having fallen in line behind the economist and the reformer. Indeed, the drift of the papers at this session on the 'doctor's future' was nothing less than an advocacy of making medicine a part of statecraft and the doctor a public servant of infinitely more importance to the commonwealth than the politician in Congress. Ideas travel fast, and both speakers of the evening, Charles L. Dana and Algernon L. Bristow, laid down as a pattern suggestive for America the system of social insurance which has recently gone into effect in England.

"Dr. Dana saw in the future a general practitioner whose work should be largely prophylactic. Working in coöperation with him, he saw a body of specialists very much larger and better equipped than we have today, who should get their training through a perfected hospital system in use by practically all the sick. He noted that already the tendency toward institutional care in sickness is well under way; and he noted also that such care, or care by the nurse in the home, is beginning to supplant cure by drugs, and that a decrease in the number of physicians is being accompanied by better training of those who graduate from the medical schools.

"The physician of the future, Dr. Dana believed, in his prophylactic function, should have the care of more than merely the living individual. He should be the great eugenist, the Æsculapius who would appear side by side with Venus in every true and realistic love story, to protect the race yet unborn. The prophylaxis of the physician-statesman of the future, would be still broader; he would be the public sanitarian. The food and drug supply would come under his supervision, and he would supervise conditions both of labor and of recreation.

"Dr. Bristow discussed that development of the medicine of the near future which both he and Dr. Dana considered the most important—social insurance for those whose very poverty makes the family physician an impossible luxury, and who today have to fall back upon the medical benefit society for such half care as it gives in time of illness. In the single state of New York he showed that two races alone, the Jews and the

Italians, have three hundred thousand members in sick benefit societies. The only alternative that the future offered to people thus circumstanced was, he believed, to depend on the overworked, ill-paid, inefficient lodge doctor, or to provide mutually for themselves through social insurance.

"For the physician himself he believed that social insurance held no menace, but, rather, a promise of a surer means of earning a livelihood."

The Survey, December 14, 1912.

Vaccination Reduces Army Typhoid.

The War Department has just issued some statistics in support of the effectiveness of the new typhoid fever inoculation. It is stated that there have been only 12 cases of typhoid fever and only two deaths, among the 57,000 troops of the United States during the past ten months. Most of the cases, it was asserted, were among recruits who had not received the treatment. Both of the deaths—one of an officer, the other of a recruit—occurred among the men who had not been inoculated. The records of the army in regard to this disease are claimed to be unsurpassed, and advocates of the theory of inoculation as a safeguard against typhoid look upon it as justification of their position.

In view of the fact that some of the troops are in the field serving under conditions which in previous years would have resulted in typhoid at the rate of 150 cases and 15 deaths in a corresponding period, army doctors feel that there is no question of the wisdom of this inoculation. The rates of typhoid per thousand, beginning with 1906, is as follows: 1906, 5.66; 1907, 3.55; 1908, 2.94; 1909, 3.03; 1910, 2.32; 1911, .80, and 1912, .18. With a view of use of the treatment in the state militia, it is announced that the anti-typhoid serum can be procured from the Medical department, United States army, at an approximate cost of 12½ cents for each complete inoculation of three doses, and may be obtained either as a charge against the allotment of the state under section 1661, Revised Statutes, or as a purchase for cash from the state funds, under the provisions of section 17 of the Militia law.

Social Legislation.

The Survey for December 7, 1912, reviews the work of the Sixty-second Congress from the standpoint of the passage of legislation of a social character, and indicates the most notable results in the following manner:—

"The Phossy Jaw Act, prohibiting the use of white phosphorus in the manufacture of matches.

"The eight-hour law and the eight-hour provisions in the postal, fortifications, and naval appropriation bills—not new legislation, but an extension of old.

"The provision in the postal appropriation bill allowing federal employees to petition Congress and join what organization they please.

"Extension of the Federal Workmen's Compensation Act.

"Amendment to the postal appropriation bill, giving to publications of labor and fraternal organizations the same postal privileges as are given to other publications.

"Establishment of the Children's Bureau.

"Establishment of the Commission on Industrial Relations."

Infant Mortality and the Employment of Mothers.

This is the subject of volume thirteen of the U. S. Government reports on Woman and Child Wage-Earners in the United States, recently issued. The introduction to the report lays emphasis on three main points. First, in 1900 the infant mortality rate (deaths under 1 year per 1,000 births) was 159.3 as contrasted with a death rate of only 14.1 per 1,000 population over one year. In other words, the infant rate was eleven times the rate for all other ages of childhood and adult life. Second, while there has been a persistent decline in the general death rate during the last few decades, the infant mortality rate has persistently remained about where it was before the period of improved sanitation. "Indeed, in many places it appears that they die in greater numbers and more readily than in the past." Third, the

factors in the problem fall into two groups, the first including general sanitary conditions, urban, rural, domestic and municipal, housing, etc., and the second, social conditions, involving ignorance, economic welfare, the employment of women, illegitimacy, and similar problems. The report may be obtained from the Commissioner of Labor, in Washington.

Mental Hygiene.

That a great step forward is about to be taken in the means and methods employed in the control of mental defectives is indicated by the outlines of a plan given by Doctor Barker, as reviewed in the *New York Times* for November 10. Doctor Barker, as president of the National Committee for Mental Hygiene, announces that an unnamed philanthropist is willing to give $50,000 for this cause, provided another $200,000 is raised. Doctor Barker is quoted in part as follows:

"If the doctrines of modern medicine are true, the general problems of mental hygiene become obvious; broadly conceived, they consist, first, in providing for the birth of children endowed with good brains, denying, as far as possible, the privilege of parenthood to the manifestly unfit, who are almost certain to transmit bad nervous systems to their off-springs, that is to say the problem of eugenics; and second in supplying all individuals, from the moment of fusion of the parent germ cells onward, and, whether ancestrally well-begun or not, with the environment best suited for the welfare of their mentality."

The immediate instruments to be utilized in the proposed campaign are, first, advanced research and investigation for prevention and cure of the various forms of insanity; and second, an educational, publicity campaign, the spreading of all knowledge already ascertained among the people by means of exhibits, literature, press accounts, etc. The latter is of special importance, for progress depends on the overcoming of the ignorance, apathy, and prejudice so characteristic of the public mind in its attitude toward this most vital problem.

The Commission on Industrial Relations.

On December 17, 1912, President Taft sent to the Senate the following nominations for the recently authorized Industrial Commission:

George Sutherland, attorney-at-law, George B. Chandler, member of the Connecticut Legislature, Charles S. Barrett, President of Farmers' National Union, Frederick A. Delano, Adolph Lewisohn, Ferd C. Schwedtman, Austin B. Garretson, John B. Lennon, James O'Connell.

Immediately after the appointment a meeting of the committee which had promoted the legislation was called, and issued the following statement, as reported in the *Survey* for December 28, 1912:—

"The appointments by the President to the Commission on Industrial Relations, just announced, are a great disappointment to the large body of economists and social workers who presented to the President and to Congress the need for a searching inquiry into the causes of unrest and the relations of labor and capital. Such an inquiry would be of great value to the nation if conducted by a group of persons well known for their special training and experience in relation to the problems which have grown out of recent industrial changes and the widespread disaffection of labor, who would work together and present in an authoritative way to public opinion the reasons for much needed remedial legislation. Some of the nominees are men of ability and distinction in public affairs, but the commission as a whole fails especially in the following particulars:

"1. No woman has been named a member of the commission, although there are now more than 6,000,000 women wage earners in the nation.

"2. There is no well-known economist or social worker, to speak for the increasingly effective work that is being done by our universities and colleges, civic and social organizations and the more authoritative element of the public press, in the analysis of the forces of industrial democracy.

"3. While the three representatives of employers in certain notable particulars are representatives of the interests of employers,

and the representatives of labor were officially recommended by the Executive Council of the American Federation of Labor and the Railway Brotherhoods, it will be generally recognized that the commission lacks men of such public prominence in this special field of inquiry as to give assurance that the enlightened public interest, which is the chief interest at stake in this most important task, will be adequately represented.

"President Taft himself, in his message to Congress recomending the creation of this commission, said, 'The time is ripe for a searching inquiry into the subject of industrial relations which shall be official, authoritative, balanced and well-rounded.' Whatever the excellence of the individual members, the commission as a whole, if confirmed by the Senate, will not in the eyes of the public meet this high hope."

This statement was signed by such representative men as John B. Andrews, J. W. Jenks, Paul U. Kellogg, S. M. Lindsay, Stephen S. Wise, Edward T. Devine, and others of equal prominence. The *Survey* concludes that "it is the hope of the committee, that either the president will reconsider his nominations, or that the Senate will fail to confirm them."

School Hygiene.

"One hundred and twenty-five thousand school children of Buffalo and vicinity will sign a mammoth invitation, to be sent to the heads of nearly fifty nations, requesting them, for the sake of their little cousins in those lands, to send as many delegates as possible to the fourth International Congress of School Hygiene, which meets here in August. In addition, the invitation will be signed by Dr. Charles W. Eliot, President Emeritus of Harvard, who is President of the Congress; Mayor Louis P. Fuhrmann and other prominent men.

"Among the nations to which the invitation will be sent are England, France, Germany, Russia, Italy, Spain, Finland, Rumania, Servia, Greece, Portugal, Holland, Sweden, Denmark, China, Japan, Korea, India, Canada, Brazil, Argentina, Chile, and Ecuador.

"Formal invitation for the congress will be issued through the State Department in Washington. President-elect Woodrow Wilson will be asked to make the opening speech."

New York Times, December 25, 1912.

The Discontinuance of the Free Administration of Diphtheria Antitoxin by the Department of Health of the City of New York.

The free administration of antitoxin in diphtheria, and the performance of intubation, by the inspectors of the Department of Health of the City of New York, was begun in 1895, the objects in view being not only the cure and prevention of the spread of the disease, but also the education of the medical profession and the general public. These ends have been accomplished. The death rate of the disease in Manhattan and The Bronx has fallen from 15.9 per 10,000 of population in 1894 to 2.2 in 1912. In 1894 twenty-nine out of every one hundred cases reported, died. In 1912 less than nine cases out of every hundred died. Since 1895 almost 40,000 cases have been injected with antitoxin furnished by the Department of Health, and of these, less than 6 per cent. proved fatal. Finally, the records show that at the present day practically every case of diphtheria receives antitoxin.

On and after February 1, 1913, therefore, the present system of free administration by inspectors of the Department of Health, of diphtheria antitoxin and performance of intubation at the homes of the patients, at the request of attending physicians, will be discontinued. After that date, when it becomes necessary for the Department of Health to administer antitoxin or perform intubation in any case of diphtheria, the patient will be at once removed to one of the hospitals of the Department for further observation and treatment. Diphtheria antitoxin may still be obtained, free of charge, by physicians from supply stations at drug stores for use where payment for the same by the patient would be a hardship.

Compulsory Sanitation.

"The government of the United States has made it plain to the government of Ecuador that it must clean up the pest-hole of Guayaquil, and that it must do so in accordance with plans approved by Colonel Gorgas of the United States army medical corps, who, with a staff of experts, has already gone there to study the situation.

"Readers will ask what right this government has to interfere thus arbitrarily with the domestic affairs of another nation, and what power it has to compel Ecuador to submit.

"The right springs from the duty that the United States owes to the rest of the world. Guayaquil is the nearest South American port from which foreign ships will clear for the Panama Canal, and is a port of call for much of the shipping of the southern Pacific. The city, which has eighty thousand inhabitants, is built on the low banks of the broad estuary of the Guayas River. All about it is stagnant water that breeds mosquitoes. It has no sewer system and no adequate water-supply. Yellow fever and typhoid are always prevalent there, and bubonic plague appears at frequent intervals. When Mr. Root, then our Secretary of State, made his tour of South America, he refused to visit Guayaquil because of the danger to the health of his party, and, for the same reason, Mr. Bryce, the British ambassador, on his recent trip along the west coast of South America, would not land there.

"When the Panama Canal is opened, ships from different parts of the world will call at Guayaquil, and in addition to their cargoes, will take on plague-infested rats and the germs of yellow fever and typhoid, and carry them through the canal to the rest of the world. The probability that the canal will increase the business of Guayaquil, and therefore the risk of spreading its diseases, has made the cleaning up of the place imperative.

"The power of the United States to compel Ecuador to submit grows out of its right to control the shipping that passes through the canal. If Ecuador permits Guayaquil to remain a pest-hole, we can close the canal to all ships that call there. The result of that course would be that foreign vessels would avoid the city, in which case even its present small trade would die.

"The army medical corps has banished yellow fever from Cuba and from the Canal Zone of the isthmus, and has freed Manila from plague, cholera, and other Oriental diseases. It is quite as capable of cleaning up the port of Guayaquil."

The Youth's Companion, January 16, 1913.

An Important Decision.

A recent decision by the Supreme Court of Ohio with reference to the responsibilities of counties under the tuberculosis law of 1909 is of a peculiar significance to anti-tuberculosis workers, both because of the points covered and also because of the unusual language used by the court rendering its decision.

By the Act of 1909 and as amended in the year following, any county in Ohio may erect a tuberculosis hospital by vote of its county commissioners, or any five counties may combine to erect a joint or district hospital in the same manner. The case which has just been decided by the court, arose over the withdrawal of Stark County from an agreement with four other counties to erect a hospital for Akron because the cost of construction as originally estimated was found to have been increased. The case was carried through the Circuit Court and finally into the Supreme Court. In both courts the judges held that Stark County, after once agreeing to enter into a combination to build a district hospital had no right, legally or otherwise, to withdraw from this combination and that it must maintain its share of the joint burden of the erection and maintenance of the district hospital. Commenting on this matter, the Supreme Court's decision reads:

"When the joint board provided for in that section (3148 G. C.) has been duly formed in accordance therewith, and has thereafter proceeded with the performance of the duties imposed on it by the statute, each of the counties whose commissioners have joined in the formation of such joint board, has obligations in connection with the matter, which are fixed and defined by the

statute and which cannot be terminated at the will of such county.

"The act of the legislature, which provides for establishing and maintaining a district hospital for the care and treatment of persons suffering from tuberculosis, is a valid exercise of legislative power, not repugnant to the constitution."

In regard to the necessity and advisability of such legislation Judge Johnson, who wrote the opinion says: "This law was passed in response to an intelligent public sentiment which was formed in the light of gratifying advances in medical science in recent years. The legislature in the enactment of the law exercised the police power which belongs to it on the depositary of the sovereignty of the state, and in the performance of its duty to provide for the health, safety and best interest of the people. It was an effort on the part of the legislature to provide a plan for arresting the advance, and, if possible, for the extermination of a dreadful disease."

Further particulars concerning this case may be secured from Mr. James E. Bauman, assistant secretary of the Ohio State Board of Health, Columbus, Ohio, to whom the JOURNAL is indebted for the information contained in this note.

An Interesting Presentation.

As a mark of their appreciation of the courtesies shown them by the officials of the New York City Health Department on the occasion of their recent visit to this country, Professors Gärtner of Jena, and Weber of Berlin, have presented the Department of Health with a bust of Robert Koch. A bas-relief of Koch was also presented as a personal gift to Dr. Charles Bolduan, assistant to the General Medical Officer.

Mental Hygiene in Preventive Medicine.

Under this title the *New York Medical Journal* for December 28, 1912, discusses the work of the different organizations interested in the prevention of insanity and mental defectiveness. It points out that while immigration is one of the causes of the alarming increase in mental unsoundness in this country, it is not the only factor. The editorial discusses the work of the National Commitee for Mental Hygiene and states that the aim of that organization is "to conserve mental health in every possible way; to promote the study of mental disorders and to popularize the knowledge of their causes, treatment, and prevention; and to promote the organization in each State of a society for mental hygiene, similar to the one now existing in Connecticut. The National Committee for Mental Hygiene, in short, aims 'to become a clearing house for the nation on the subject of mental health, the prevention of nervous and mental disorders, the care and treatment of the insane; and aims also to become a coördinating agency for all State and local agencies interested in these problem.'"

In conclusion, the editorial points out the obligations which from this standpoint, rest upon the physicians of the country:—

"Physicians have been slow to realize that the prevention of insanity and mental defectiveness, not only in relation to the individual patient, but more particularly from the eugenic standpoint of the survival and improvement of the race, is one of the most significant and valuable fields of modern preventive medicine. But there is a rapid awakening to this new conception, and the pioneer work of these committees for mental hygiene deserves active support and intelligent coöperation."